THE STATE HEALTH DEPARTMENTS OF MASSACHUSETTS, MICHIGAN, AND OHIO

BY JAMES WALLACE, M.D.

BOSTON
MEDICAL LIBRARY
8 THE FENWAY

THE STATE HEALTH DEPARTMENTS OF MASSACHUSETTS, MICHIGAN, AND OHIO

THE STATE HEALTH DEPARTMENTS OF MASSACHUSETTS, MICHIGAN, AND OHIO

WITH A SUMMARY OF ACTIVITIES
AND ACCOMPLISHMENTS
1927-1928

BY

JAMES WALLACE, M.A., M.D., C.P.H.

Associate Field Director Committee on Administrative Practice
American Public Health Association

NEW YORK
THE COMMONWEALTH FUND
DIVISION OF PUBLICATIONS
1930

COPYRIGHT, 1930, BY
THE COMMONWEALTH FUND
DIVISION OF PUBLICATIONS
PUBLISHED AUGUST, 1930

32. B. 420.

PRINTED IN THE UNITED STATES OF AMERICA

FOREWORD

THE Committee on Administrative Practice of the American Public Health Association, having received a number of requests from public health officials for detailed studies of the organization of state health departments, was desirous of having such studies made as soon as funds for doing so were available. In 1928, the Commonwealth Fund granted appropriations to cover the field work in three states that were reputed to be among the better organized for official public health activities. The field studies were therefore undertaken and reports on the findings prepared.

The writer of the digest, herewith published, personally made the three field studies referred to, and as a follow-up to them, and with the approval of the Committee on Administrative Practice, he has undertaken to compress into one small volume the main facts set forth in the three field reports, and to include some new and additional material in order to bring the volume up to date.

The facts as set forth in the reports on the field studies were checked over by the different state health departments concerned, and it is believed that the figures and facts herein submitted are substantially correct. While any opinions expressed are those of the author, the Committee believes that Dr. Wallace's varied experience in planning and administering state health services fully qualifies him to analyze this important field. Dr. Wallace was formerly Deputy State Health Commissioner for Iowa; State Epidemiologist for Utah; and member of special staff of the International Health Board of the Rockefeller Foundation.

It is the belief of the Committee that these studies will prove useful for teaching purposes in institutions training

men for state and local public health work, and that they may form the beginning of detailed studies of the individual functions of state health departments. In this manner it may be possible eventually to develop suitable standards for judging the adequacy of services within the state, similar to those already evolved and found valuable in surveys and appraisals of cities.

COMMITTEE ON ADMINISTRATIVE PRACTICE

C. E.-A. WINSLOW, DR. P.H., *Chairman*
HAVEN EMERSON, M.D., *Vice-Chairman*
LOUIS I. DUBLIN, PH.D., *Secretary*

E. L. BISHOP, M.D.
CHARLES V. CHAPIN, M.D.
HENRY F. VAUGHAN, D.P.H.
ALLAN W. FREEMAN, M.D.
GEORGE D. LUMMIS, M.D.
GEORGE T. PALMER, D.P.H.
GEORGE C. RUHLAND, M.D.
A. J. CHESLEY, M.D.
SOPHIE C. NELSON, R.N.
HOMER N. CALVER
MICHAEL M. DAVIS, PH.D.
W. F. DRAPER, M.D.
W. S. RANKIN, M.D.

W. F. WALKER, D.P.H., *Field Director for Committee*

CONTENTS

INTRODUCTION 1

Chapter I.

ORIGIN AND PRESENT FORM OF THE THREE STATE DEPARTMENTS OF HEALTH 7

Chapter II.

LOCAL OFFICIAL PUBLIC HEALTH ORGANIZATION 18

Chapter III.

DIVISIONS OR BUREAUS OF THE STATE DEPARTMENTS OF HEALTH

Division of Administration 27
Vital Statistics 36
Communicable Disease Control 51
Venereal Disease Control 74
Tuberculosis Control 81
Sanitary Engineering 92
Public Health Laboratories 105
Division of Hygiene 115
Public Health Nursing 132
Control of Milk, Food, and Drugs, and Sanitary Inspection 134
Popular Health Instruction 139
Industrial Hygiene 142
Mental Hygiene 144
Other Activities 146

Chapter IV.

PUBLIC HEALTH APPROPRIATIONS AND EXPENDITURES 149

Chapter V.

COMMENTS ON THE STATISTICAL DATA AND DESCRIPTIVE MATERIAL PRESENTED 159

APPENDIX A: APPRAISAL STANDARDS 183

APPENDIX B: SELECTED BIBLIOGRAPHY 191

LIST OF TABLES

I. General Information with regard to Massachusetts, Michigan, and Ohio 4

II. Statistics regarding General Health Districts exclusive of City Health Districts, Ohio, 1927 . 33

III. Comparison of Consolidated Scores for Ninety-three Cities and Eighty-six Counties, Ohio, 1926 34

IV. Death-rates for Certain Communicable Diseases and Infant Mortality Rates, Massachusetts, Michigan, and Ohio, 1900-1928 47

V. Certain Vital Statistics, Massachusetts, Michigan, and Ohio, 1927 50

VI. List of Reportable Diseases, Massachusetts, Michigan, and Ohio, 1928 68

VII. Reporting of Certain Communicable Diseases as compared with Number of Deaths, Massachusetts, Michigan, and Ohio, 1927 71

VIII. Reporting of Certain Communicable Diseases as compared with Number of Deaths, Massachusetts, Michigan, and Ohio, 1928 72

IX. Hospitalization of Certain Communicable Diseases in Urban and Rural Areas, Massachusetts, Michigan, and Ohio, 1927 73

X. Reporting of Cases of Venereal Diseases, Massachusetts, Michigan, and Ohio, 1925-1928 . . . 79

xi. Clinic Service for Venereal Diseases, Massachusetts, Michigan, and Ohio, 1927 80

xii. Hospital Beds for the Tuberculous, Massachusetts, 1927 83

xiii. Number of Deaths from Tuberculosis and Death-rates per 100,000 Population, Massachusetts, Michigan, and Ohio, 1925-1928 . . . 89

xiv. Number of Cases of Tuberculosis Reported and Case Rates per 100,000 Population, Massachusetts, Michigan, and Ohio, 1925-1928 90

xv. Care of Tuberculous Cases, Massachusetts, Michigan, and Ohio, 1927 91

xvi. Inspections Made by the Engineering Division, Massachusetts, 1927 93

xvii. Public Water Supplies, Ohio, 1928 100

xviii. Data on Water Supplies, Sewerage, etc., Massachusetts, Michigan, and Ohio, 1927 103

xix. Examinations and Analyses, State House Laboratories and Lawrence Experiment Station, Massachusetts, 1927 107

xx. Biologics Distributed by the Biological Laboratories, Massachusetts, 1927 108

xxi. Examinations Made in the State Department of Health Laboratories, Massachusetts, Michigan, and Ohio, 1927 113

xxii. Data on Health Activities in the Schools, Massachusetts, Michigan, and Ohio, 1927 . . 130

XXIII. Control of Milk, Massachusetts, Michigan, and Ohio, 1927 137

XXIV. Compensable Cases Reported, Ohio, 1927 . . 144

XXV. Total Appropriation and Expenditures by Divisions, State Department of Health, Massachusetts, 1915-1927 152

XXVI. Total Appropriation and Expenditures by Bureaus, State Department of Health, Michigan, 1915-1927 154

XXVII. Total Appropriation and Expenditures by Divisions, State Department of Health, Ohio, 1915-1927 156

XXVIII. Budgets of the Departments of Health by Divisions or Bureaus, Personnel, and Salaries, Massachusetts, Michigan, and Ohio, 1927 . . 158

XXIX. Appraisal Standards of Public Health Activities used by the American Public Health Association 183

LIST OF CHARTS

1. Organization of the Massachusetts State Department of Health, 1928 6

2. Organization of the Michigan State Department of Health, 1928 11

3. Organization of the Ohio State Department of Health, 1928 15

4. Growth of Population in Massachusetts, Michigan, and Ohio, 1765-1928 26

5. Scarlet Fever: Death-rates per 100,000 Population in Massachusetts, Michigan, and Ohio, 1900-1928 38

6. Diphtheria: Death-rates per 100,000 Population in Massachusetts, Michigan, and Ohio, 1900-1928 . 39

7. Typhoid Fever: Death-rates per 100,000 Population in Massachusetts, Michigan, and Ohio, 1900-1928 42

8. Tuberculosis (all forms): Death-rates per 100,000 Population in Massachusetts, Michigan, and Ohio, 1900-1928 43

9. Decline in Typhoid Fever Death-rates per 100,000 Population compared with Increase in Use and Treatment of Public Water Supplies in Massachusetts, Michigan, and Ohio, 1870-1928 . [*facing*] 102

10. Infant Mortality Rates per 1,000 Live Births in Massachusetts, Michigan, and Ohio, 1915-1928 . 116

INTRODUCTION

THE subjects dealt with in the following pages and the statistical facts presented are based on field studies made in the states of Massachusetts, Michigan, and Ohio, with special reference to the organization, activities, and accomplishments of the State Health Departments in these three states. Through the courtesy of the State Health Commissioners and their staffs it was possible in these studies to gather a vast amount of general and statistical information, so that it seemed desirable to prepare a digest of the main facts brought out by the studies, and in this way to provide a convenient handbook for students of public health organization and public health administration. In 1914, Dr. C. V. Chapin[1] undertook for the American Medical Association a study of existing state health departments in the United States, and more recently the International Health Division of the Rockefeller Foundation on behalf of the Conference of State and Provincial Health Authorities of North America undertook to collect data for 1925 on the official state health organizations in the different states. The United States Public Health Service published in 1929 the data so collected.[2] So far as known, there have been no state studies comparable in scope to those made by the writer for the above mentioned states.

It is not the purpose of this digest to make comparisons between the states studied. For the sake of brevity it has

[1]Charles Value Chapin, M.D., *A Report on State Public Health Work Based on a Survey of State Boards of Health* (Chicago: American Medical Association, 1915).

[2]United States Public Health Service, *Health Departments of States and Provinces of the United States and Canada*, Public Health Bulletin No. 184 (Washington: Government Printing Office, 1929).

been found desirable to present certain statistical data in parallel columns so that some degree of comparison is unavoidable, but the reader is left largely to make his own comparisons. Such comparisons, however, cannot fail to be unfair unless the greatly varying conditions in each state are taken into account. "What's done we partly may compute, but know not what's resisted." The extent of authority vested in state departments of health, the local physical conditions, the equipment and personnel provided may differ, the backing given the department by the public may be quite dissimilar, and the urgency for action in regard to some service may be much less in one state than in another, due to past accomplishments of the department or to some other reason.

Some definite legal responsibility has been laid upon each state and municipality, and through them upon the health department, for the protection of the public health. There has been entrusted to the constituted authorities the formulation and enforcement of rules and regulations governing those diseases that require for their control concerted action and definite public health measures. To discharge this responsibility a state requires, as does a local municipality, the necessary organization and equipment. States may differ as to the degree of authority vested in the state department of health as contrasted with the authority vested in the local administrative unit, but all state health departments have some authority and all can accomplish a great deal by suasion, by gaining and holding the confidence of the local community, and where necessary, by assisting the local unit to put into operation worth-while health projects.

The digest gives an outline of health organization in local administrative units (such as townships, villages, counties, and cities) in the different states. The form of organiza-

tion in use in Ohio is given in some detail because rural health administration is particularly well advanced in Ohio, and because many health workers are desirous of knowing the form of organization existing there.

For those who have a liking for appraisals and may wish to make them, a section is included setting forth the main standards and criteria used by the Committee on Administrative Practice of the American Public Health Association in its appraisals of cities and rural communities. A short general critical statement in regard to the organization, activities, and policies of the different health departments is also included, but as the three departments are usually assigned a place among the best-organized health departments in the forty-eight states, commendation rather than criticism is often in order.

The purposes of the digest are in brief:

1. To set forth the organization and main activities of a state health department and its relationship to other (official and non-official) health activities in the state.

2. To provide for students of public health a brief outline of state and local health organization.

3. To provide some of the data on which, if it is thought advisable, certain standards might be based for appraising the activities of state health departments, and which might eventually result in the drawing up of some kind of appraisal form suitable for such departments.

The following information with regard to the three states is given in tabular form to save space and to take the place of an historical sketch. The table contains data conducive to a better understanding of the background and development of public health problems, health trends, and forms of public health organization in the states under consideration.

TABLE I

GENERAL INFORMATION WITH REGARD TO MASSACHUSETTS, MICHIGAN, AND OHIO

	MASS.	MICH.	OHIO
General Information[1]			
Seat of public health administration	Boston	Lansing	Columbus
Area in square miles	8,039	57,480	40,074
Mean temperature for January and for July	28-72°F	24-72°F	30-75°F
Date of first white settlement	1620	1668	1788
Date of admission to the Union	1788	1837	1803
Date of establishment of State Board of Health	1869	1873	1886
Population			
1800	422,845	[2]4,762	45,365
1850	994,514	397,654	1,980,329
1900	2,805,346	2,420,982	4,157,545
1920	3,852,356	3,668,412	7,559,394
1928 (estimate midyear)	4,290,000	4,519,000	6,826,000
Per cent distribution by residence, 1920:			
Rural	5.2	38.0	36.2
Urban	94.8	62.0	63.8
Per cent of population colored, 1920	1.1	1.6	3.2
Wage earners in manufacturing establishments, 1925	591,438	[3]281,638	[4]780,604

[1] The wealth of the three states may be compared as follows:

	Assessed valuation	*Taxes*	*Per capita wealth*
Massachusetts	$7,086,011,958 (1927)	$208,855,252 (1927)	$3,546 (1925)
Michigan	7,709,790,000 (1926)	17,800,000 (1927)	3,021 (1925)
Ohio	13,431,475,870 (1927)	299,108,429 (1926)	3,233 (1925)

[2] This figure is for 1810.

[3] Trades with less than 5,000 employees are not included.

[4] This figure is for 1926.

TABLE I—Continued

	MASS.	MICH.	OHIO
Per cent distribution by age groups, 1920:			
Under 1 year.	1.9	2.1	1.9
1 year through 4 years .	8.1	8.9	8.3
5 years through 9 years .	9.3	10.0	9.5
10 years through 14 years .	8.7	8.9	8.8
15 years through 19 years .	7.8	8.1	8.1
20 years through 44 years .	40.0	40.2	40.1
45 years and over	24.2	21.7	23.2
Unknown	....	0.1	0.1
Public Health Services			
Number of physicians, 1927	6,242	5,245	8,287
Population per physician, 1927	700	855	789
Number of public health nurses, 1927	1,280	383	828
Population per public health nurse	3,285	11,400	7,900
Number of hospitals, 1927	306	229	347
Number of hospital beds[5] .	48,218	32,309	43,446
Beds per 1,000 population[6] .	5	4	4
Number of hospitals for tuberculosis.	[7]26	21	28
Number of beds for the tuberculous	3,555	2,198	3,010
Per cent of population under organized full-time health service, 1928	[8]50.0	63.1	44.0
Number of rural full-time health units.	[9]1	3	47

[5] Including those in state and federal institutions.
[6] Not including those in state and federal institutions.
[7] Not including penal institutions.
[8] Twenty-five per cent medical health officers, 25 per cent lay health officers.
[9] In addition, there are six full-time district health officers for the whole state.

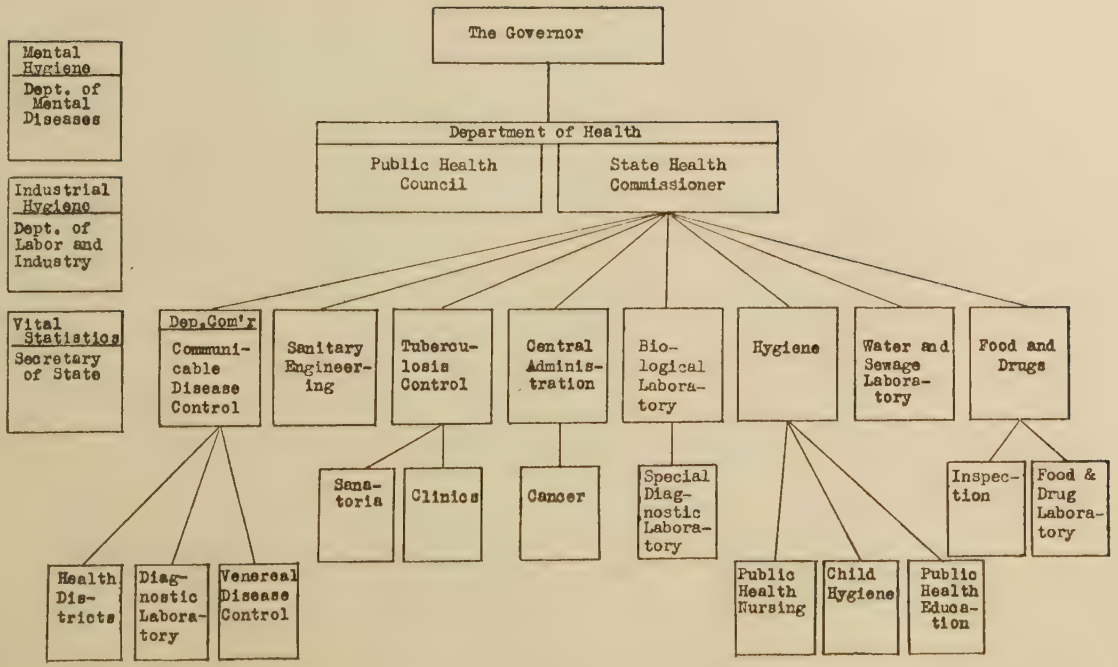


CHART I. ORGANIZATION OF THE MASSACHUSETTS STATE DEPARTMENT OF HEALTH, 1928

CHAPTER I

ORIGIN AND PRESENT FORM OF THE THREE STATE DEPARTMENTS OF HEALTH

MASSACHUSETTS

MASSACHUSETTS was the first state in the Union to establish (in 1869) a state board of health. The desirability of such a board had been pointed out by Lemuel Shattuck twenty years earlier.

Its commission was to "take cognizance of the interests of life and health of the citizens of the Commonwealth," and to make investigations, collect data, and give information and advice to the Legislature from year to year. Ten years later the Board was reorganized as a Board of Health, Lunacy, and Charity, but in 1886 the Board of Health became again a separate organization. On December 12, 1914, the Board was replaced by a Department of Health with a State Health Commissioner as executive officer (to be aided by an Advisory Public Health Council).

The *Commissioner* is appointed by the Governor (the Senate concurring) for a five-year term and must be a physician skilled in sanitary science and experienced in public health administration. He is the executive and administrative head of the Health Department, administers the health laws, employs and removes employees, drafts rules and regulations, and suggests legislation for the approval of the Advisory Public Health Council.

The *Advisory Public Health Council*, consisting of six appointive members (the Commissioner being a member ex

officio), three of whom must be physicians, is appointed by the Governor for terms of three years. Two members retire each year. Regular meetings of the Council are held monthly, and special meetings may be called by the Commissioner.

The six councillors are each allowed ten dollars per diem and expenses when attending meetings. The Council is required to make rules and regulations which, upon adoption by local authorities, have the force of law (see page 52), hear appeals, and discharge specific duties delegated to it, but it has "no administrative or executive function."

The *Department of Health* is composed of the Commissioner, the Advisory Public Health Council, and the members of the Department staff. It has the same commission as was entrusted to the original Board of Health with more specifically defined responsibilities in regard to water supplies, sewage disposal, and biological products. It is required to define the diseases dangerous to the public health and "it shall have coordinate powers as a board of health in every town, with the board of health thereof." It may definitely prohibit the use of a common towel or common drinking cup, but its main function is advisory. Even in regard to water supplies and sewage disposal, the Department is required to "consult with and advise the officers of towns and persons having or about to have systems of water supply, drainage, or sewerage" installed.

The Department of Health as organized at the present time consists of the following divisions:

1. *Central Administration*, including a Bureau for Cancer Study.
2. *Communicable Disease Control*, including (1) Health Districts (2) Diagnostic Laboratory, (3) Venereal Disease Control.
3. *Tuberculosis Control*, including (1) Sanatoria, (2) Clinics.
4. *Sanitary Engineering*.

5. *Biological Laboratory*, including a special diagnostic laboratory (Wassermann, etc.)
6. *Hygiene*, including (1) Child Hygiene, (2) Public Health Education, (3) Public Health Nursing.
7. *Water and Sewage Laboratory*.
8. *Food and Drugs*, including (1) Inspection, (2) Laboratory for Food and Drugs.
9. *Adult Hygiene*. Massachusetts has recently (midyear 1929) added another division to the State Health Department to be known as the Division of Adult Hygiene, to be directed by the officer who has been in charge of the cancer control program.

There is no division in the Department for vital statistics as this branch of health work is still under the Secretary of State, nor is there a division for mental hygiene, activities along this line being largely under the State Department of Mental Disease. The control of milk, except as to chemical quality and as it may be associated with the spread of disease, is largely under the Department of Agriculture, and industrial hygiene is under the Department of Labor and Industry.

The diagram on page 6 will give an idea of how the Department was organized up to the time of adding the Division of Adult Hygiene.

MICHIGAN

The Michigan State Board of Health was created in 1873. As originally organized it consisted of six members and a secretary appointed by the Board. In 1913 the secretary was made an appointee of the Governor, but in 1917 the manner of his appointment was changed, so that, while appointed by the Governor, he must first be recommended by the Board of Health. In 1919 the State Board of Health was abolished and replaced by an Advisory Council of

Health consisting of five members appointed by the Governor. At the same time the office of State Health Commissioner was created, the Commissioner to be appointed by the Governor and to be the executive officer of the State Department of Health.

The *Commissioner of Health* must be a physician who has had at least five years' experience in the practice of medicine or who holds a doctorate in public health or its equivalent. The appointment is for four years. He is required to make rules and regulations for safeguarding the public health and to enforce such rules and regulations as are concurred in by the Advisory Council of Health. The "Commissioner shall exercise all of the powers and perform all the duties vested in the State Board of Health." He may take charge of a local situation where conditions warrant such action, although in cities he may do so only when the Advisory Council approves such a course. He has no legislative or judicial power, but the rules of the Department when concurred in by the Advisory Council have the force of law. The Commissioner has visitorial and supervisory powers over all public water supplies and sewage disposal systems, and may prohibit public meetings when the public health is endangered. He employs and discharges personnel, though notice of proposed additions or changes in personnel must be submitted to the State Administrative Board.

The *Advisory Council of Health*, consisting of five members serving for six-year terms (provision being made that not more than two members retire in any one year) is appointed by the Governor. No qualifications for appointment are specified. The function of the Council is advisory, except that a majority of members must concur in the rules and regulations prepared by the Commissioner in order to make them effective, and must sanction any proposal by the

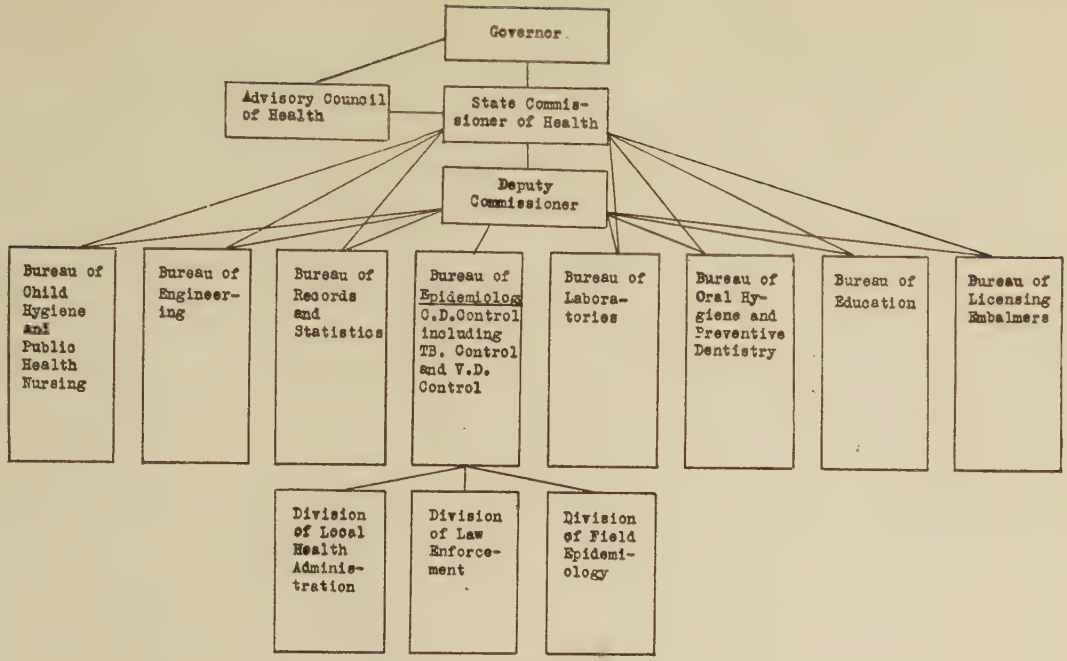

Governor
Advisory Council of Health
State Commissioner of Health
Deputy Commissioner
Bureau of Child Hygiene and Public Health Nursing
Bureau of Engineering
Bureau of Records and Statistics
Bureau of Epidemiology C.D.Control including TB. Control and V.D. Control
Bureau of Laboratories
Bureau of Oral Hygiene and Preventive Dentistry
Bureau of Education
Bureau of Licensing Embalmers
Division of Local Health Administration
Division of Law Enforcement
Division of Field Epidemiology

CHART 2. ORGANIZATION OF THE MICHIGAN STATE DEPARTMENT OF HEALTH, 1928

Commissioner to take charge of a local situation in a city. The Council is required to meet at least five times a year, and each member receives ten dollars per diem and expenses when attending meetings. The Council has no executive, judicial, or legislative authority other than that its concurrence in rules and regulations made by the Commissioner is necessary to give them the force of law. The present Council consists of four physicians and a dentist.

The *Department of Health* is composed of the Commissioner, the Deputy Commissioner, and the heads and assistants in the eight different bureaus of the Department. The Department of Health is therefore the group through which the Commissioner carries on the official state health work, enforces the rules and regulations for the protection of health, and carries out in general the duties imposed by law on the Commissioner.

As organized in 1929, it included the following bureaus:

1. *Epidemiology.* This Bureau was established June 11, 1924, replacing the Division of Communicable Diseases.
2. *Records and Statistics.* This Bureau was established in 1921 by Act 170, Public Acts of the State Legislature, transferring the vital statistics and their collection and supervision from the office of the Secretary of State to the State Department of Health.
3. *Laboratories.* This Bureau was founded in 1908 and was reorganized by Act 146, Public Acts of the State Legislature, in 1919.
4. *Engineering.* This Bureau was established in 1913, replacing the form of inspectorship that had previously existed.
5. *Child Hygiene and Public Health Nursing.* This Bureau combines activities that in most state health departments are separated. The Bureau was established in 1925 by Act 100, Public Acts of the State Legislature.
6. *Mouth Hygiene and Preventive Dentistry.* This Bureau was established on January 1, 1926.

7. *Licensing Embalmers.* This Bureau was established in 1903 by Act 132, Public Acts of the State Legislature, which was later amended in 1919, 1921, and 1925.
8. *Public Health Education.* This Bureau was established in 1920, though for two years previously a publicity section existed which was devoting its time almost wholly to campaigns in connection with venereal disease.

The Department of Health is not the licensing body of any of the professions, nor does it have charge of registration fees or registration of the professions.

OHIO

A State Board of Health was first created in Ohio in 1886. It consisted of seven members and a secretary, all of whom were physicians. The Board elected its own secretary. In 1917, the State Department of Health was created by the General Assembly; by this change a State Health Commissioner was appointed by the Public Health Council with the approval of the Governor. The Commissioner and four appointive members were to constitute the Public Health Council, which was identical with the State Department of Health as constituted by law. With the adoption of the Administrative Code of 1921 the title of "Commissioner" was abolished and the title of "Director of Health" substituted.

The *Director of Health* must be a physician skilled in sanitary science. He is appointed by the Governor and is a member of his cabinet. The Governor's term is two years, so while he is eligible for reappointment, the term of the Director of Health may be said to be two years. He is chairman of the Public Health Council and is required to exercise such powers and perform such duties as are specified in the administrative code. He must "administer the laws

relating to health and sanitation and regulations of the State Department of Health. He shall prepare sanitary regulations for consideration by the Public Health Council and shall submit recommendations for regulations to the Council." He is required to define and classify hospitals, may administer oaths, may demand entry for investigation of sanitary law violation, and shall publish a health manual for health officers and boards of health.

The *Public Health Council* is composed of the Director of Health and four members appointed by the Governor. Of the four appointive members, two must be physicians and all must be skilled in sanitary science. The members are appointed for four-year terms, one member retiring each year. They are entitled to traveling expenses and $10.00 per diem while in attendance at meetings of the Council. Meetings are held at least four times a year. The Council is authorized to make and amend sanitary regulations, to take evidence in appeals, to conduct hearings, to define the number of divisions and the qualifications of directors in the Department of Health, and to give advice to the Commissioner on any matter concerning the public health, but it "shall have no executive or administrative authority."

The *State Department of Health* consists by legislative act of the Director of Health and the Public Health Council. The Department as an executive and working force consists of the Director of Health, the Assistant Director, and the chiefs and assistants in the nine divisions of the Department. When the Department was created in 1917 all powers and duties of the Board of Health were transferred to the Department, such as "supervision of all matters relating to the preservation of the life and health of the people" in regard to quarantine, regulations to prevent spread of disease, local enforcement of regulations where there is

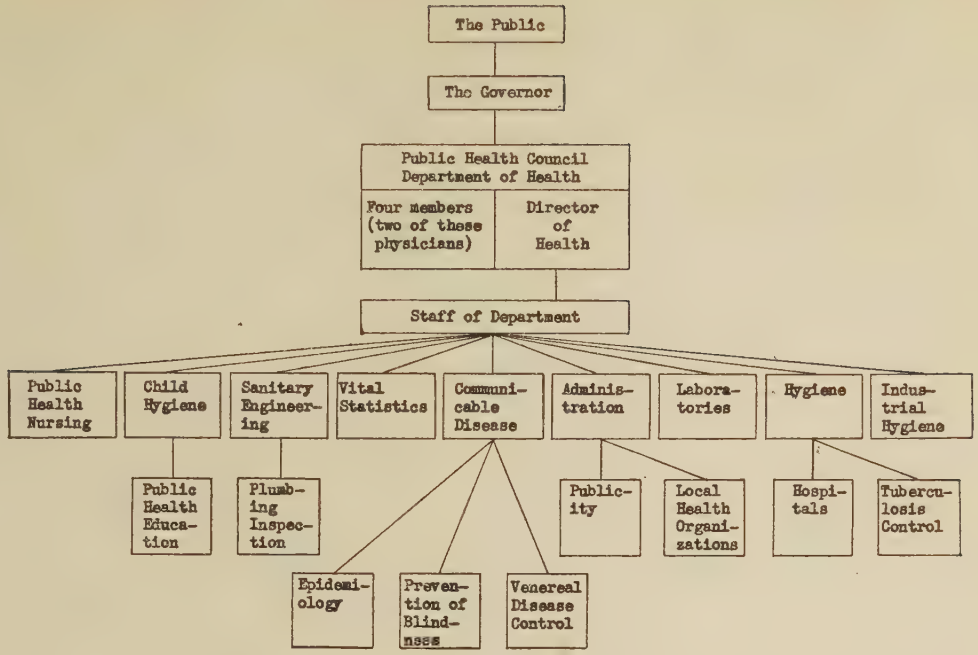


CHART 3. ORGANIZATION OF THE OHIO STATE DEPARTMENT OF HEALTH, 1928

neglect by local authorities, and general supervision of water supplies and disposal of wastes.

The Department of Health as organized in 1929 includes the following divisions:

1. *Administration.* This Division was created in 1912 under the State Board of Health and was continued when the Department of Health was substituted for the Board. The Assistant Director of Health is at the head of this Division. There is a staff of twelve members and the Division includes two bureaus: Publicity and Local Health Organization.
2. *Communicable Disease.* This Division was created in 1912, one year after an epidemiologist was first employed. It now has as subdivisions the Bureau of Epidemiology, the Bureau of Venereal Disease, and the Bureau of Prevention of Blindness (the two last having been transferred to it from the Division of Hygiene). The staff consists of a chief and ten others. Among these are five district health supervisors who work from the central office and perform the functions of epidemiologist-consultants and advisers in public health matters which come within the scope of the Division's activities.
3. *Sanitary Engineering.* A sanitary engineer was first employed by the State Board of Health in 1898. In 1909 an Engineering Department was created; in 1912 it became the Division of Engineering and in 1914 its title was changed to Division of Sanitary Engineering. The Division now has as a subdivision a Bureau of Plumbing Inspection. This subdivision has gone through several changes. In 1911 a State Inspector of Plumbing was appointed, and in 1912 the Division of Plumbing Inspection was created. In 1919 it was made a Bureau and grouped under the Division of Sanitary Engineering. The Division of Sanitary Engineering has, in addition to the chief, seventeen employees.
4. *Laboratories.* This Division is housed in a building at the Ohio State University grounds. In 1898 a chemist-bacteriologist was first employed, and in 1909 a state laboratory was definitely established. In 1911 the laboratory became

known as the Hygienic Laboratory, and in 1912 the Division of Hygienic Laboratories was created. The staff consists of a chief and thirty-one others.

5. *Vital Statistics.* This Division was created as a Bureau of Vital Statistics in 1908 and was put under the Secretary of State. With the adoption of the Ohio Administrative Code in 1921, the Bureau was transferred to the State Department of Health and became a Division. The staff consists of a chief and twenty-six assistants.
6. *Hygiene.* This Division was, when first created in 1913, the Division of Tuberculosis, with a Bureau of Public Health Nursing. In 1914 it became the Division of Public Health Education and Tuberculosis, with a Bureau of Public Health Nursing as a subdivision. In 1919 the Division of Hygiene was created with Bureaus of Tuberculosis, of Venereal Disease, of Child Hygiene, of Rural Hygiene, of Public Health Nursing, and of Hospitals, all of which, except Tuberculosis and Hospitals, have since been made Divisions or transferred to other Divisions. The staff of the Division now consists of ten persons. Rural Hygiene was transferred, in 1923, to the Division of Administration to become the Bureau of Local Health Organization. Since January 1, 1930, the Division has included a Bureau of Dental Hygiene.
7. *Industrial Hygiene.* This Division was first created in 1913 and was called the Division of Survey of Occupational Diseases. In 1915 it became the Division of Industrial Hygiene. The staff consists of a chief, a consultant, and a stenographer.
8. *Public Health Nursing.* This Division was created in 1923, when it was separated from the Division of Hygiene. It has now attained the full status of a division. The staff consists of a chief and five others.
9. *Child Hygiene.* This activity, which was first a bureau under the Division of Hygiene, was in 1926 separated to become a division by itself. It is directed at the present time by the chief of the Division of Hygiene and has a staff of twenty-two workers in the office and the field. The Bureau of Public Health Education now functions under this Division.

CHAPTER II

LOCAL OFFICIAL PUBLIC HEALTH ORGANIZATION

MASSACHUSETTS

IN Massachusetts, with the exception of Barnstable County on Cape Cod, each city and town (township) is a separate administrative health unit. There are 355 such units in the state, with an additional one for registration purposes at Tewksbury, the seat of a state institution. The right to local self-government in matters of public health has been extended to the smallest political unit in Massachusetts. With so many existing units, unless State Department of Health influence was particularly compelling and generally exercised, there would naturally be great diversity of practice and little general uniformity in public health administration. That uniformity is lacking is generally true, for, except for a few special items, the Legislature has been sparing of the authority entrusted to the State Department of Health, preferring to legislate in specific instances for individual communities rather than to enact general laws that would apply to the whole state.

Local Boards of Health in Cities

In all cities except Boston, which is under special charter, "the board of health shall consist of three persons, one of whom must be a physician. No one of these shall be a member of the city council." Appointment is for three years and is made by the mayor and confirmed by the aldermen. One member retires each year. The board may

employ a physician as its adviser and may appoint an agent to act for it and "may make reasonable health regulations" applicable to its own district.

Local Boards of Health in Towns (Townships)

At the annual meeting of the town each year there shall be chosen by ballot "three members of the board of health for the term of three years if the town provides such a board, otherwise the selectmen shall act as a board of health." A town may vote to increase or decrease the number of persons composing the local board of health. Where the selectmen act as the board they may choose an inspector to assist them. For Barnstable County, the only county health unit in the state, special legislation was obtained. Barnstable County, Boston, Fall River, Pittsfield, and Worcester are the five units in the state that in 1928 had full-time health service with a physician as health officer. These localities represent about 25 per cent of the state population; another 25 per cent is under full-time lay service (non-medical).

MICHIGAN

Act 306, Public Acts of 1927, gives county supervisors the authority to provide a county health department, the cost of which is to be met from the general funds of the county; the health officer is to be selected by the board of supervisors. Provision is made for excluding or including cities of the county that have organized health departments of their own, and for the uniting of two or more counties to form a health unit when such union is thought advisable.

Local Boards of Health in Cities

In incorporated cities and villages the mayor and aldermen of each incorporated city, and the president and council

or the trustees of each incorporated village in which no board of health is organized under its charter, shall have and exercise all the powers and duties of a board of health. The local board of health is required to appoint a health officer who is a well-educated physician. If no such physician is available, the supervisor or some other person may be appointed health officer. This local board is authorized to make such regulations and by-laws as may be considered necessary to protect the public health. These rules, however, must not be in conflict with the state regulations that are applicable to the whole state.

Local Boards of Health in Townships

In every township, "the township board (consisting of the supervisor, the two justices of the peace whose term of office will soonest expire, and the township clerk) shall constitute the board of health." The supervisor is the president, and the township clerk is the clerk of the board. The same duties devolve upon the board as upon the local boards of health in cities.

Three counties in Michigan have organized county health units as provided for in Act 306, Public Acts of 1927. Michigan has undertaken (July, 1929) to increase its number of full-time county units from three to ten and is receiving financial aid and personnel assistance from the International Health Division of the Rockefeller Foundation through a transfer of one of its staff who has been for the last two years Director of the Darke County Demonstration Unit in Ohio.

In Wayne County, a group of four villages has an organized full-time health service, and one township north of Detroit is similarly organized. Fourteen cities have full-time health service, so that all told about 44 per cent of the state population is under full-time service.

OHIO

Prior to the passage of the Hughes-Griswold Act in 1919 there were in Ohio 2,581 administrative health districts, ninety-eight of these being in cities and the remainder in villages and townships. The Hughes-Griswold Act abolished all village and township health boards and adopting the county as the unit, created what are called *general health districts*. The status of cities in regard to health organization was in no way changed by the Act, except that provision was made for including cities in the general health district, if the citizens desired to become a corporate part of the unit.

City Health Districts

In Ohio each municipality with a population of 5,000 or over is classed as a city. According to the General Code each city constitutes a health district and is called a city health district. "The council of each city constituting a city health district shall establish a board of health composed of five members appointed by the mayor and confirmed by the council. . . . . The mayor shall be president by virtue of his office." Board members serve without compensation. A city, however, may make provision by charter for health organization other than the form here specified. If a city fails to appoint a board of health, the State Director of Health with the approval of the Public Health Council may appoint a local health commissioner. Members of the city board of health are appointed for five-year terms, one member retiring each year. Meetings of the board must be held at least once a month. The city board of health "may make such orders and regulations as it deems necessary for its own government, for the public health, the prevention or

restriction of disease, and the prevention, abatement, or suppression of nuisances." The local board, however, shall not close highways or prohibit travel thereon or establish quarantine of one municipality against another, without the approval of the State Department of Health.

General Health Districts

In general health districts which, as already stated, have replaced the villages and townships as units for health administration, "there shall be a district board of health consisting of five members" who "shall receive no compensation for their services, except for all necessary and lawful expenses incurred in attending meetings of the board."

The manner of appointment of the board of health for these districts is through the *district advisory council*, which is made up of "the mayor of each municipality not constituting a city health district and the chairman of the trustees of each township." This council appoints the *district board of health*, having regard to the representation of all parts of the district. Each municipality in a district representing at least one-fifth of the population of the whole district is entitled to a representative on the board. At least one member of the board must be a physician. The district advisory council at its annual meeting in May appoints the district board of health. The expenses of the district advisory council are met by the districts represented.

The *district health commissioner* is appointed by the district board of health for a term not to exceed two years. He must be a licensed physician and "shall devote such time to the duties of his office as may be fixed by contract with the district board of health."

The commissioner becomes the executive officer of the

district board of health and assumes all authority formerly vested in health officers of villages and townships. He is to carry out all orders of the district board of health and of the State Department of Health and "keep the public informed in regard to all matters affecting the health of the district."

As already indicated it is possible to have what is called a *combined city and general health district.* If the district advisory council approves, and representatives of the townships and villages concerned and the council of the city or cities vote affirmatively by majority vote on the proposed combination, "the chairman of the district advisory council and the mayor or chief executive officer of the city shall enter into contract for the administration of health affairs in the combined district." The contract will define the proportion of expense to be borne by the city and general district respectively, the character of the sanitary service to be rendered, and the date when the combination becomes effective. On that date the health department of the city takes over the administration of the combined health district and assumes all the powers and is to perform all the duties of the board of health in a general health district. The city board of health, therefore, becomes the sole administrator for the combined district. This complete delegation of responsibility to the city board, while required by law, is not usually practised, as it has been found to be in the interest of the district as a whole to have representation on the board from the area lying outside the city. In 1928 there were in the state seventeen combined health districts in which were included eighteen cities. The present working plan for these is based on a "gentleman's agreement" between the city officials and the officials of the rural parts of the county already referred to. In 1928, of the eighty-eight

counties in Ohio, forty-seven were organized and directed by full-time district health commissioners.

Provision is also made in the General Code for the combination of two general health districts when such a union is desirable. This is effected by favorable votes by each of the district advisory councils. The two district advisory councils then meet in joint session and elect a district board of health of five members, not more than three of whom are to be from one general health district. Such a combined general health district shall be governed like other health districts, and the administrative office is to be located at the seat of government of the more populous county unless it is agreed to have it located elsewhere. The boards of health in these general and combined districts may each appoint a clerk, a nurse or nurses, and such other workers as may be necessary properly to carry on public health work in the district.

The duties of the district advisory council, the district board of health, and the district health commissioner may be summarized as follows:

The district advisory council:

- Appoints the boards of health.
- Receives annual and special reports.
- Makes recommendations to the district board of health and to the State Department of Health.

The district board of health:

- Appoints employees.
- Studies and controls communicable diseases.
- Provides for abatement of nuisances.
- Provides for necessary laboratory work.
- Provides for free distribution of antitoxin.
- Draws up the annual budget.
- Makes general orders and regulations.
- Provides for free treatment of syphilis and for quarantine.

Establishes detention hospitals.
Cares for the sick and the poor and for each person quarantined.
Provides for inspection of foods and of public institutions.
Makes annual reports to the district advisory council.

The district health commissioner:

Acts as secretary of the board of health.
Acts as executive officer of the board of health.
Acts as deputy of the registrar of vital statistics.
Recommends the employment of assistants.
Performs the duties required by law of the health commissioner.
Makes the reports to the district board of health and to the State Department of Health.

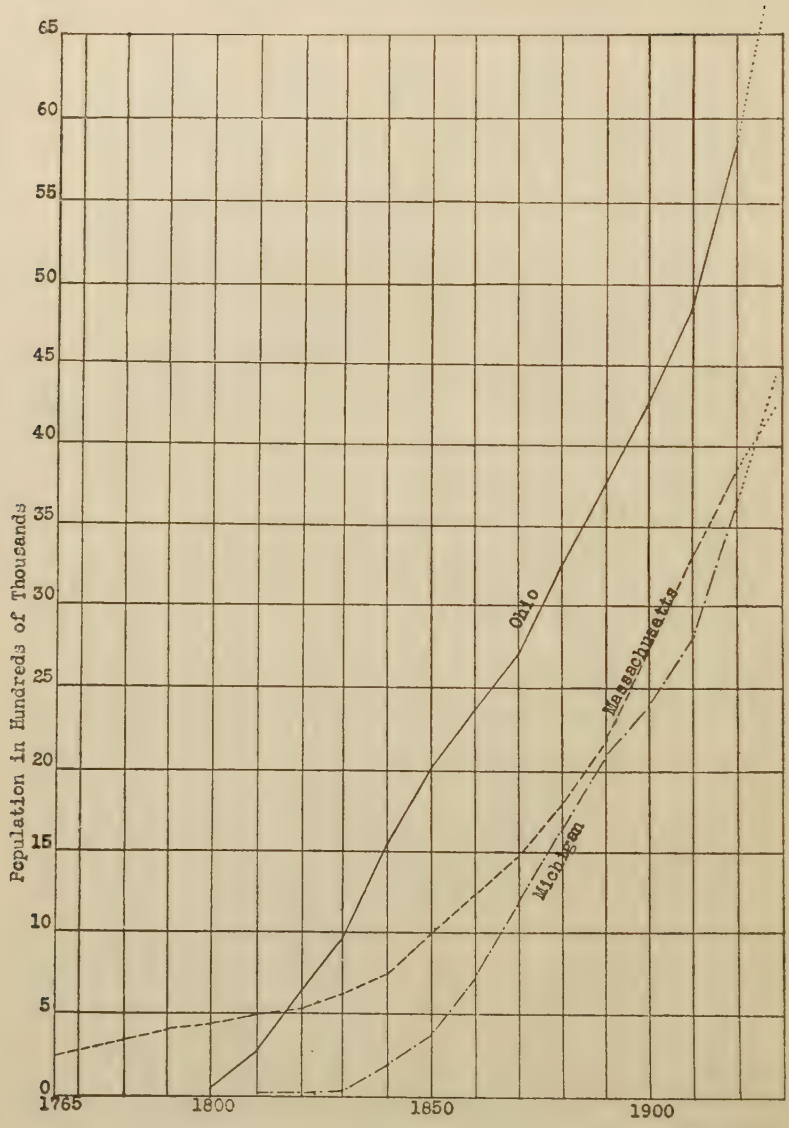


CHART 4. GROWTH OF POPULATION IN MASSACHUSETTS, MICHIGAN, AND OHIO, 1765–1928

CHAPTER III

DIVISIONS OR BUREAUS OF THE STATE DEPARTMENTS OF HEALTH

Division of Administration

MASSACHUSETTS

THE Division of Central Administration consists of the Commissioner (or, in his absence, the Deputy Commissioner, who is head of the Communicable Disease Division), the Commissioner's secretary, and fourteen clerks and stenographers. As a subdivision of this Division, there is a group of eight (a director and seven assistants) conducting a special study of cancer, making a total in the Division of twenty-four persons.

The Commissioner is the executive and administrative officer and is responsible to the Governor for the discharge of duties entrusted to him. The business administration of the Health Department is done through his office. Purchases for the Department are made by the State Purchasing Bureau on requisition from the Commissioner. Appropriations for the Department are made under (1) salaries and (2) expenses. The amount to be spent for salaries is fixed, but the matter of how it is to be spent, the number of employees to be engaged, etc., is left to the Commissioner, except the fixing of the salaries of directors of divisions. A general oversight of all expenditures is exercised by the State Commissioner of Administration and Finance. All monies received by the Department of Health from dispen-

sary fees and licenses to cold storage plants are turned over to the State Treasurer.

The policies of the Department are defined by the Commissioner aided by the Advisory Public Health Council and his chiefs and assistants in the different lines of public health activity in which the Department engages.

The general policies of the Department are:

The education of the public to the value of preventive measures.

Cooperation with the medical profession and all other professional or lay groups desiring to promote health according to scientifically sound methods.

The development of public interest in local public health problems so that the organization or machinery necessary for adequate and efficient local public health service may be provided.

The maintenance of relations with local organizations in a purely advisory, promotional, and demonstrational capacity, for the purpose of developing local facilities and preventing errors of inexperience in policy and procedure.

Subdivision for the Study of Cancer. A special group in the Division of Administration is making a study of cancer. This study had been prompted by the fact that Massachusetts from 1920 to 1925 had the highest death-rate for cancer of any state in the Union and because the public in Massachusetts in general and the Legislature in particular are greatly interested in finding out what can be done about cancer. The Legislature in 1926 appropriated $15,000 for cancer clinics and $100,000 to make over a building at Pondville for use as a hospital for cancer cases. This hospital has ninety beds and these, together with beds available for cancer cases in other hospitals, provide what is considered to be 50 per cent of the total requirement for adequate hospitalization for cancer cases. The cost per patient per

diem at Pondville is about six dollars. Those patients who are able pay $1.50 per diem, and for those who cannot, a charge of $2.50 per diem is made against the municipality from which they come. The balance of cost has to be made up from the appropriation by the state. In making a comprehensive state-wide study of the whole cancer problem, Massachusetts is in advance of all other states, and the facts being made available by the surveys and studies are of special value as matters of research. There are now sixteen cancer clinics distributed throughout the state. Apart from the appropriation to the Cancer Hospital, the Legislature appropriates $50,000 a year, $20,000 of this for clinics and $30,000 for general administration and study of the whole cancer problem. The survey indicates that there are about 10,000 cancer cases in the state. Of this number about 3,750 enter hospitals. In 1927, 1,360 persons attended the clinics, 31 per cent of these being men and 69 per cent, women. Of those presenting themselves at the clinics, 23.1 per cent were found to have cancer (14 per cent of whom had never consulted a physician) and of those having cancer 68.8 per cent were found to be in an operable stage. Among those over fifty years of age who came to the clinics, 56.8 per cent were found to have cancer. Most of those who came to the clinics (61.6 per cent) stated that they came because their interest was aroused through newspaper publicity. It was found that the median interval between the first symptoms and a visit to a physician was 7.4 months, and between the first symptoms and a visit to a clinic was 11.6 months, another evidence of unwillingness to seek prompt medical attention, and of the necessity for further public health education.

A few activities concerned with administration, such as district health officers in Massachusetts and county health

units in Michigan, are referred to in the sections dealing with the Division of which they form a part.

MICHIGAN

As will be seen by reference to the plan of organization on page 11, the administrative staff in Michigan is not organized as a separate bureau or division. The Commissioner and Deputy Commissioner direct the general policies of the Department and supervise the work of the Department as a whole. They are assisted by a chief clerk-auditor, the Commissioner's secretary, a stenographer, and two mailing clerks. Purchases for the Department are authorized through the Commissioner's office, and through the same office general activities and campaigns are directed, reports reviewed, and policies outlined. Funds of the Department are disbursed through the Central Accounting Division of the Auditor General's Department. The Commissioner has charge of the personnel of the Department, though additions to the staff have to be approved by the Administrative Board (the Governor and elective state officers). The main policies of the Department are:

Cooperation with physicians in an effort to have them understand and aid public health projects.

Restriction of public health activities to promotional, educational, and demonstrational work.

Decentralization of health administration in such fashion as to provide the establishment of strong, efficient local public health departments.

OHIO

The Division of Administration, which has a staff of twelve persons, is in charge of the Director of Health, but for ad-

ministrative detail is under the Assistant Director, who is an attorney-at-law and is well versed not only in public health law but in public health administration in general. This office takes charge of correspondence, is responsible for the Department's personnel (salaries are fixed by legislature), and formulates the policies of the Department. Purchases for the Department are made through the State Department of Finance, and funds are disbursed by the State Auditor on voucher from the Director of Health. All fees from plumbing licenses and from transcribing birth and death certificates are handed over to the State Treasury. Reports of divisions are reviewed in the Director's office. All members of the Department staff except the Director of Health are under civil service. The main policies of the Division are:

To make each chief responsible for his own division and, while outlining the general policies of the Department, to give the director of each division as much freedom as possible in the development of his own division.

To keep in close touch with local departments of health already operating and to assist them when necessary.

To increase, when local provision has been made for them, the number of full-time health departments in the counties in order to make adequate full-time service available to as many rural as well as urban districts as possible.

There are two bureaus in the Division: (1) Publicity; (2) Local Health Organization.

(1) *Bureau of Publicity*. This Bureau, which is directed by an experienced newspaper man, has charge of all printed matter and all publicity material. It is responsible for news releases and edits the *Ohio Health News*, the Department's bulletin. There is a separate Bureau of Public Health Education in the Division of Hygiene, which uses in its educational campaigns, material prepared by the Publicity

Bureau. The reason for keeping these two bureaus separate is not quite clear, though in Ohio there may be some advantage in having the Bureau of Public Health Education very closely connected with the Division of Hygiene, which does much of the field and educational work of the Department.

(2) *Bureau of Local Health Organization.* This Bureau directs one of the most important activities of the Ohio Department of Health. It has had for some time under its direction the largest number of full-time county health units of any state in the Union, forty-seven of the eighty-eight counties in the state being so organized. As early as 1886, Dr. W. H. Cretcher, President of the first State Board of Health, stated that Ohio would go far toward solving its health problems by having a properly trained full-time county health officer in each county. Such an arrangement, he stated, would prolong life, reduce human suffering, and save millions of dollars for the state. In addition to the forty-seven counties with full-time service, there are thirty-nine others that have part-time service, so that there are only two unorganized counties in the state, and one of these counties has two cities that have organized health service. Of the ninety-three cities in the state, thirty-three have full-time service and sixty part-time service. Prior to 1919, when the Hughes-Griswold Act was passed (see page 21), there were only two full-time health commissioners in the whole state.

The state of Ohio makes an annual appropriation of $250,000 as a subsidy to local health departments that comply with state requirements. This sum is given to help reimburse departments for monies spent, and city health departments as well as general health departments are included. To qualify, the local health department must have a health officer (full-time or part-time), at least one public

TABLE II

STATISTICS REGARDING GENERAL HEALTH DISTRICTS EXCLUSIVE OF CITY HEALTH DISTRICTS, OHIO, 1927

	TOTAL	FULL-TIME DIRECTION	PART-TIME DIRECTION
Number of districts . . .	86	47	39
Population	2,293,144	1,464,533	828,581
Per cent distribution of population	100.0	63.21	36.88
Total expenditures. . . .	$702,286.50	$530,242.25	$172,044.25
Average cost per capita. .	$.31	$.36	$.21

health nurse, and a clerk. The subsidy from the state is prorated according to the amounts expended by the local departments, but in no case is the amount granted to a unit more than $2,000 per year. If all districts were organized and all qualified, there would be about 181 units, so that the present appropriation would allow an average subsidy of only about $1,400 per unit. Outside of the state subsidy, all but one of the local units are self-supporting. There is one county (Darke) that, because of the work it is doing as a teaching and demonstrational unit, is being aided by the International Health Division of the Rockefeller Foundation to the extent of $5,200 per year.

The Director of the Bureau of Local Health Organization visits and supervises for the State Department the local health departments; about 75 per cent of the time so spent is given to health departments in rural districts. Local departments are very generally adopting, as the basis for their annual reports to the State Department, the Appraisal

Forms prepared by the American Public Health Association. This results in uniformity of reports and makes possible the measurement of progress in each community as well as the comparison of the consolidated scores for all organized areas.

A comparison of the consolidated scores in 1926 for ninety-three cities and eighty-six counties is shown in Table III.

TABLE III

COMPARISON OF CONSOLIDATED SCORES FOR NINETY-THREE CITIES AND EIGHTY-SIX COUNTIES, OHIO, 1926

ACTIVITY	PER CENT OF POSSIBLE SCORE OBTAINED	
	CITIES	COUNTIES
Vital statistics	58.5	72.0
Communicable disease control	57.7	71.2
Venereal disease control	47.2	54.6
Tuberculosis control	34.6	52.4
Preschool hygiene	48.1	25.7
School hygiene	50.0	68.2
Sanitation—food, milk, water, sewage	48.8	39.5
Laboratory service	73.5	52.4
Popular health instruction	40.0	67.5
All activities	52.0	51.9

The tendency in general health districts has been to increase from year to year the local appropriations for public health work; for example, in 1927 less than 12 per cent of the districts showed any reduction in the appropriation, about 20 per cent duplicated the appropriation of the previous year, and the remainder made from a slight to a very definite increase in appropriations for health work. The

increases are now much more general than they were in the years immediately following the establishment of the first general health districts.

Darke County Unit

There are many counties in Ohio doing health work of good quality and considerable volume. Darke County receives special mention here not because its work overshadows similar work in other counties, but because it has developed an organization to educate health officers, nurses, and others coming from within and from without the state.

The city of Greenville (located in Darke County), the county of Darke, and the State Department of Health joined forces in 1927 to establish a county unit which should be a teaching unit. As stated above, they received assistance from the International Health Division of the Rockefeller Foundation. The purpose of the unit was:

> To organize such health work as would adequately meet the needs of the communities served.
>
> To expand the work to the limit of the combined resources of the two boards of health.
>
> To utilize the unit as a base where prospective health commissioners, public health nurses, sanitary inspectors, and other health workers might have opportunity to observe or participate in health work.

The combined unit of Darke County had been operating only eleven months at the close of 1927, but during that period it had built up a staff of ten workers, and had rendered 19,293 health services which included sixty-seven health talks, 787 visits for communicable diseases, 217 laboratory examinations, 3,928 sanitary inspections, and 163 other services. Nurses had made 6,245 home calls; weighing stations

had been set up forty-seven times; 502 visits had been made to schools and 7,333 school children had been physically inspected. In the eleven months, Greenville and thirteen of the eighteen other incorporated places in the county had had sanitary surveys completed. Two hundred and fourteen health workers from thirteen states and as many countries had visited the unit for instruction and information. Four health commissioners now at work in the state were trained at this unit. The total budget for the eleven months was $18,107.35; of this amount the state paid $3,870.73 and the International Health Division $4,583.32, the balance being made up locally.

This unit is not only doing good work locally, but it is proving a useful source of instruction for health workers in the state as well as for health workers who are to render service in other states and in other countries.

Vital Statistics

MASSACHUSETTS

The recording of vital statistics is not an activity of the Massachusetts State Department of Health. Massachusetts is now the only state in which vital statistics continues to be directed by the Secretary of State. As long ago as 1914, Dr. Charles V. Chapin stated that "the collection of vital statistics, which is now in the hands of the Secretary of State, should be transferred to the Health Department."

Massachusetts has had a law requiring the registration of vital statistics since 1639, and since 1841 the Secretary of State has had charge of the activity. Massachusetts was one of the original thirteen states which formed the Death

Registration Area and was one of the first group of states to be included in the Birth Registration Area. The Vital Statistics Bureau consists of a director and twelve statistical clerks. Reports are received from the 356 registration units in the state. The local registrars in towns (townships) are the town clerks elected by the people; in cities the registrar is usually the town clerk similarly elected, though he may in some cases be named by the aldermen. "Any city except Boston and any town containing more than 100,000 inhabitants may provide for the appointment of a person other than the clerk to be registrar." Some town clerks are required to do duty as registrar as part of their regular duties, without extra pay; others are paid one dollar per birth certificate and fifty cents per death certificate registered. There is no general requirement that health departments shall be notified in regard to a death reported as due to communicable disease. The state law requires death returns to be made to the Secretary of State before the tenth of the succeeding month. In small towns births must be registered before the first of March each year, in larger towns before the first of April, and in larger cities before the first of May. Midwives are not recognized by the state and 99 per cent of the births are reported by physicians. The checking, verification, classification, tabulation, filing, etc., are all carried out according to approved methods. Reporting has reached a high degree of efficiency in Massachusetts, as it is estimated that 100 per cent of the deaths and at least 99 per cent of the births are reported. The tabulations and reports prepared by the Bureau are used as textbooks in some of the universities. The vital statistics records of Massachusetts are highly reliable, and about the only defect evident in the system is that, as the Bureau is not in the Health Department, unpublished statistics that

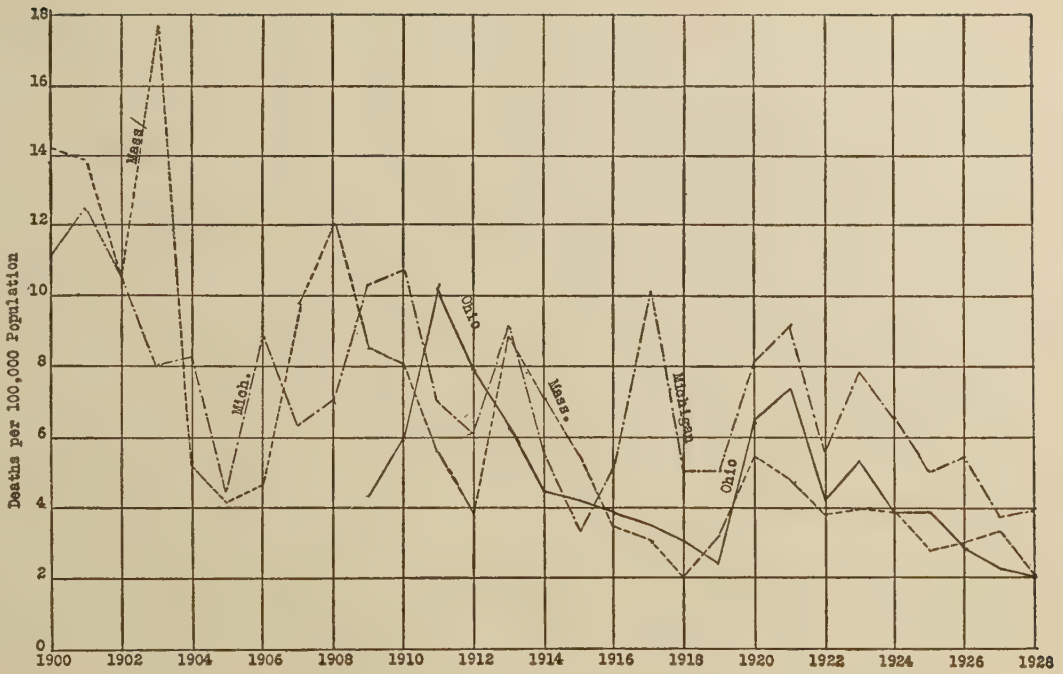


CHART 5. SCARLET FEVER: DEATH-RATES PER 100,000 POPULATION IN MASSACHUSETTS, MICHIGAN, AND OHIO, 1900–1928

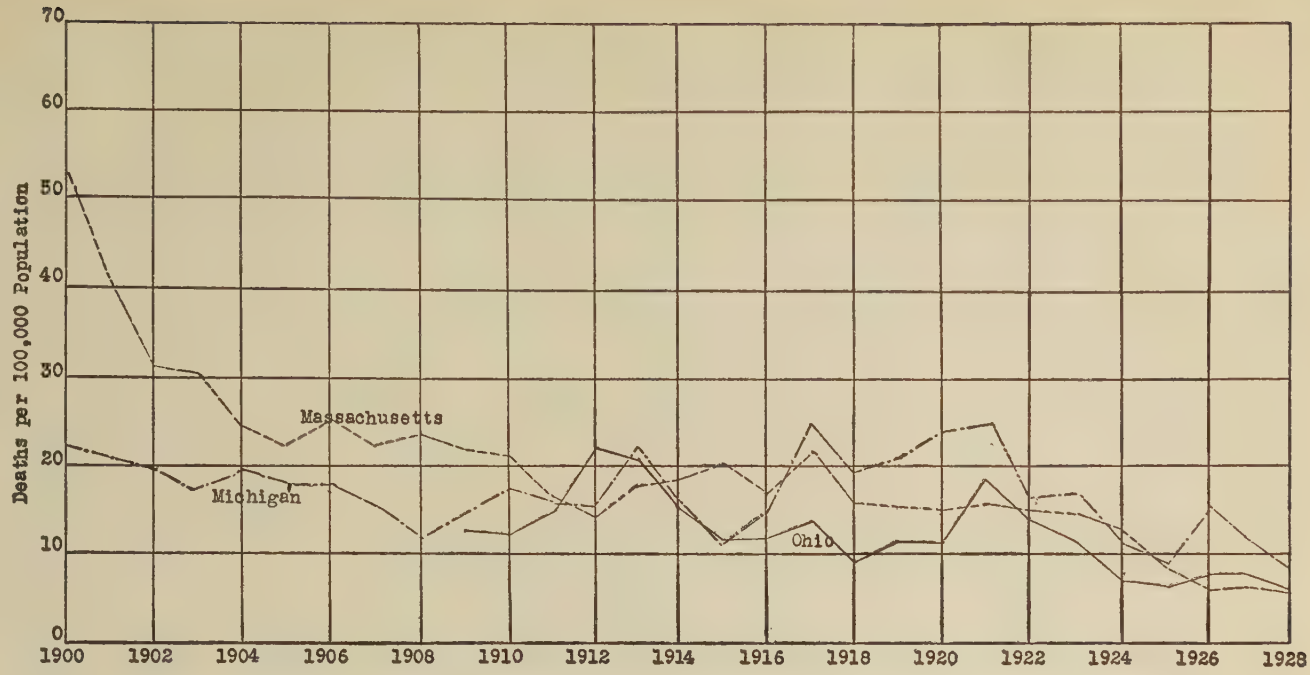


CHART 6. DIPHTHERIA: DEATH-RATES PER 100,000 POPULATION IN MASSACHUSETTS, MICHIGAN, AND OHIO, 1900–1928

the Department might use from time to time are not readily available; and, too, there cannot be the same public health interest on the part of those preparing them that there would be if the Vital Statistics Bureau were a corporate part of the Health Department. Local boards of health report to the State Department of Health when they issue burial permits for persons dying of communicable disease, and in this way the Department is able to check up on deaths from communicable disease even though local registrars are not required to notify the health officers when certificates of deaths from communicable disease are filed. All burial permits are issued by the local board of health, and a permit is necessary for interment. Still-births are reported both as births and as deaths.

In states where the vital statistics bureau is in the health department so that the comparison of reports of deaths from communicable disease with reports of cases may be made daily, not only does the department have at hand data needed in planning its activities and programs, but it is also able to check up promptly on efficiency in reporting. The data a vital statistics bureau collects are of value to a working health department largely in proportion to the promptness with which the information is made available.

MICHIGAN

In Michigan, the recording of vital statistics is done by a Bureau of the Health Department called the Bureau of Records and Statistics. The staff consists of a director, a statistician, an editor, and sixteen clerks and stenographers.

The activities of the Bureau in general are:

The collecting and collating of birth, death, marriage, and divorce records.

The collecting and studying of communicable disease reports.
The making of special statistical studies.
The enforcing of the vital statistics law.

The laws of Michigan require the registration of all births and deaths occurring in the state, and give to the Health Department the powers and authority regarding vital statistics which were formerly vested in the Secretary of State. Physicians, midwives, and others must report promptly to the local registrar, who in turn must report to the State Department of Health before the fourth of the following month. No remuneration is allowed physicians or others for such reports, and definite penalties are prescribed for failure to report. The registration unit is the township, village, city, or state institution. The local registrar is the clerk of the municipality. The law provides for having embalmers act as subregistrars. Where there is a full-time health officer in a city, the law provides that the State Health Commissioner may appoint him registrar for his city. Registrars are paid twenty-five cents per certificate by the county after certification by the State Health Department that the certificate is filed. Local registrars are required to notify the local health officer of all deaths due to communicable diseases. The State Department of Health carries on a constant campaign to obtain complete reporting, and cases of flagrant neglect are prosecuted. Physicians report 96.6 per cent of the births, and midwives, 3.4 per cent. Midwives are not licensed and have no regular supervision except in Detroit where they are definitely supervised by the city health department. The nurses of the State Department of Health occasionally give them instruction. Michigan was admitted to the Death Registration Area in 1900 and to the Birth Registration Area in 1915. Check-

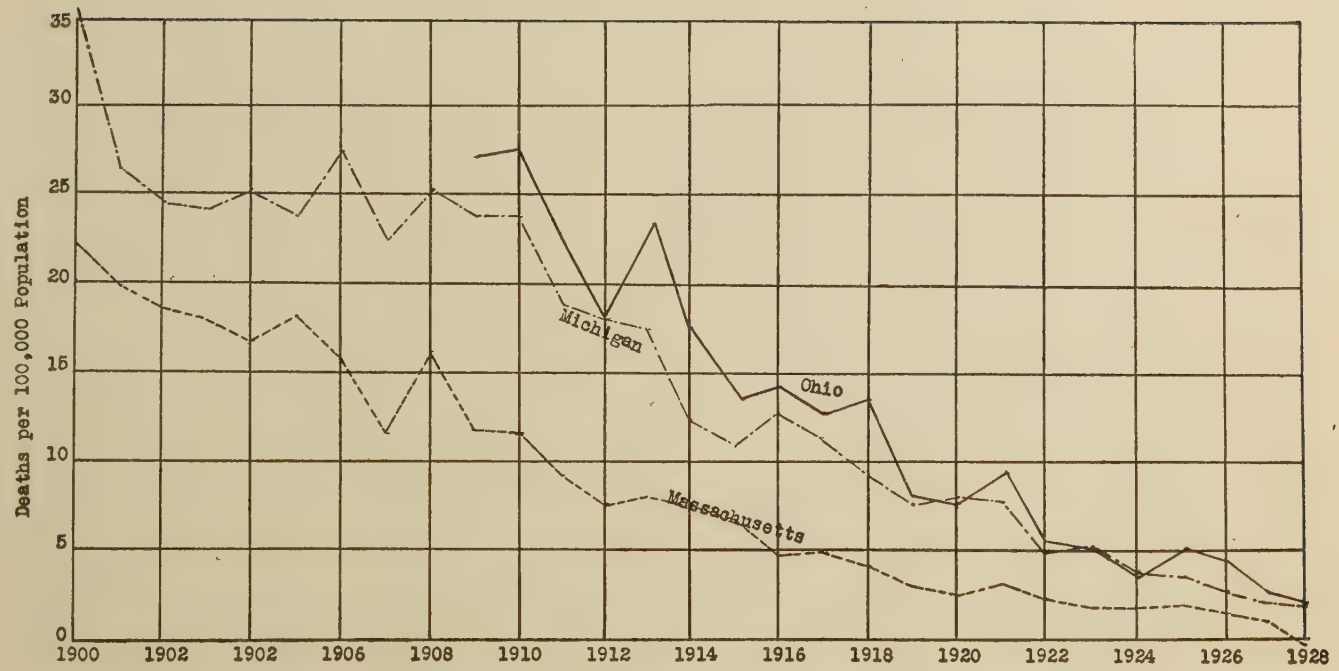


CHART 7. TYPHOID FEVER: DEATH-RATES PER 100,000 POPULATION IN MASSACHUSETTS, MICHIGAN, AND OHIO, 1900–1928

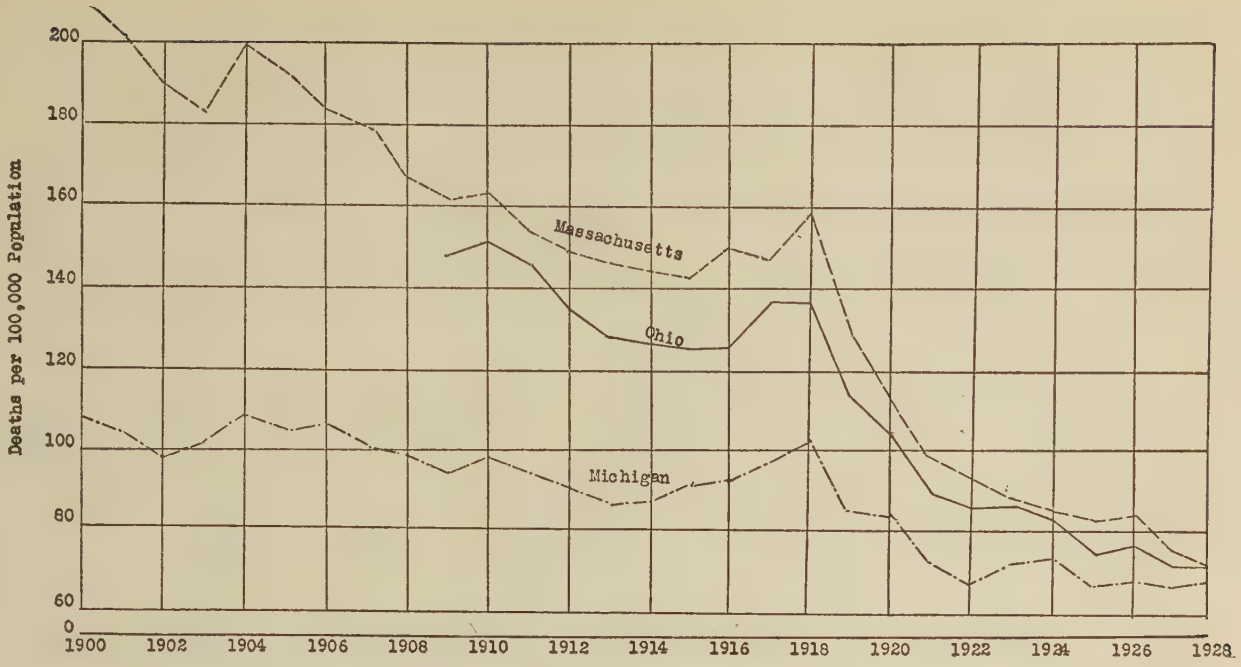


CHART 8. TUBERCULOSIS (ALL FORMS): DEATH-RATES PER 100,000 POPULATION IN MASSACHUSETTS, MICHIGAN, AND OHIO, 1900–1928

ing has shown death reports to be 95 to 96 per cent complete, and birth reports 94 per cent complete. All deaths of infants are checked against birth reports. Certificates are filed in fireproof compartments, and duplicate copies are available at fifty cents a copy.

This Bureau handles reports of cases of communicable diseases and checks each day deaths reported against these case reports. The findings are daily submitted to the Bureau that has to do with the control of communicable diseases. Still-births are recorded separately and are not included in the tabulations of either births or deaths. From time to time, the Bureau classifies, tabulates, and analyzes according to approved practices and methods reports received, and in this way is of the greatest assistance to other bureaus that require statistical information for guidance in activities and for educational campaigns. Charts and diagrams based on the statistical data at hand are constantly being prepared. The Bureau is fortunate in having as director one in whom are combined the training of a physician, an epidemiologist, and a statistician, and who can therefore prepare statistical matter in such form that it may be of the greatest practical use to public health worker and educator.

OHIO

The Division of Vital Statistics in the State Department of Health of Ohio has a personnel of twenty-five persons, namely, a chief, a chief clerk, and twenty-three tabulating and filing clerks and stenographers.

The activities of the Division are:

The indexing and filing of birth and death records.

The computation and tabulation of deaths by causes, color, sex, age-groupings, nationality, etc.

The checking up on physicians and others who fail to report.
The issuing of certified copies of birth and death certificates.
The preparation of monthly and annual statistical reports.

The Administrative Code of Ohio confers upon the State Health Department all the powers and authority in regard to reporting and registering births and deaths formerly vested in the Secretary of State. The registration unit in Ohio is the city, village, or township. In the two latter the village or township clerk is the local registrar, while in cities the city board of health appoints the registrar, who is to be subject to the rules and regulations of the State Registrar. In general health districts, the district health commissioners are deputies of the State Registrar of Vital Statistics, and each local registrar in these general health districts on or before the fifth of the following month must transmit to the district health commissioner all birth and death certificates for the month just elapsed. The district health commissioner must then within five days transmit them to the State Registrar. When a registrar receives a certificate of death due to communicable disease he must notify the health commissioner of the district within twenty-four hours. Local registrars receive a fee of twenty-five cents for registration, unless they are employed on salary. In some of the larger centers registrars are paid on a graded scale. The fees are paid by the county in which the unit is located. The Vital Statistics Division of the State Department of Health checks up on physicians and others that fail to report, and endeavors by education and occasionally by prosecution to make the reporting as complete as possible.

It is estimated that 94 per cent of the birth reports are submitted by physicians and 6 per cent by midwives. Midwives are licensed by the State Medical Board of Exam-

iners. Very few of them are in practice outside of the larger cities. Midwives must register with the local registrar, must report cases of communicable diseases and inflammation of the eyes of the new-born, and must engage only in the limited practice authorized by their certificates. Still-births are registered as both births and deaths. No burial in the state may take place without a burial permit.

Ohio was admitted to the Death Registration Area in 1909 and to the Birth Registration Area in 1917.

It is estimated that reporting of deaths is 99 per cent complete and of births 95 per cent complete.

Certificates are filed in fireproof compartments, but the space available is now overtaxed and the more recent certificates are not adequately protected. Certified copies of the certificates are available at fifty cents per copy.

The checking of deaths from communicable disease against cases is incomplete as this is done for only two diseases. Tabulation of causes of death by sex, age, color, etc., is fairly complete, but there is no tabulation by occupation and there is no printed annual report issued by the division or department. Mimeographed tabulations are distributed to those on the mailing list. Very few graphic charts are prepared by the division; whatever is done along that line is mostly done by the division in charge of communicable disease control. Most of the charts and diagrams used in the state have been prepared and distributed by a voluntary organization.

TABLE IV

DEATH-RATES FOR CERTAIN COMMUNICABLE DISEASES AND INFANT MORTALITY RATES, MASSACHUSETTS, MICHIGAN, AND OHIO 1900-1928[1]

YEAR	TYPHOID FEVER			DIPHTHERIA			SCARLET FEVER		
	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO
1900	22.0	35.6	. .	52.5	22.1	. .	14.2	11.2	. .
1901	19.9	26.3	. .	41.1	20.8	. .	13.9	12.4	. .
1902	18.5	24.5	. .	31.0	19.8	. .	10.7	10.7	. .
1903	18.1	24.1	. .	30.3	17.3	. .	17.7	8.0	. .
1904	16.7	25.2	. .	24.5	19.8	. .	5.2	8.3	. .
1905	18.0	23.9	. .	22.2	18.1	. .	4.2	4.5	. .
1906	15.9	27.3	. .	25.1	17.8	. .	4.7	8.9	. .
1907	12.6	22.2	. .	24.3	15.5	. .	9.8	6.4	. .
1908	16.1	25.1	. .	23.4	12.7	. .	12.0	7.1	. .
1909	11.8	23.7	27.0	21.6	14.5	12.5	8.6	10.3	4.3
1910	12.5	23.6	27.4	20.9	17.5	12.2	8.1	10.7	6.0
1911	9.1	18.8	22.5	17.0	16.2	14.9	5.7	7.0	10.2
1912	7.7	17.9	17.9	14.3	15.5	22.0	3.8	6.1	7.9
1913	7.9	17.4	23.4	17.7	21.9	20.7	8.8	9.1	6.3
1914	7.7	12.4	17.5	18.3	16.1	15.1	7.1	5.6	4.5
1915	6.8	10.8	13.5	20.2	11.0	12.7	5.5	3.4	4.2
1916	4.7	12.8	14.2	16.9	14.9	11.6	3.5	5.2	3.9
1917	4.9	11.3	12.6	22.4	24.9	13.6	3.1	10.1	3.6
1918	4.1	9.4	13.6	15.9	19.4	9.2	2.0	5.1	3.1
1919	2.7	7.6	8.0	15.4	20.8	11.4	3.2	5.0	2.4
1920	2.5	7.9	7.5	15.1	23.8	11.2	5.6	8.2	6.6
1921	3.1	7.7	9.2	15.7	25.0	18.4	4.8	9.1	7.4
1922	2.2	4.9	5.5	15.0	16.2	14.0	3.8	5.7	4.3
1923	1.7	5.1	5.1	14.5	16.9	11.4	4.0	7.8	5.3
1924	1.7	3.7	3.6	12.9	11.7	6.8	3.9	6.6	3.9
1925	1.8	3.8	5.1	8.1	8.4	6.1	2.8	5.0	3.9
1926	1.4	2.7	4.4	6.0	15.4	7.5	3.0	5.5	2.8
1927	1.0	2.1	2.7	6.3	11.7	7.8	3.4	3.8	2.3
1928	0.8	1.8	2.0	5.8	8.3	5.6	2.1	3.9	2.0

Note: Absence of figures means that there is no record.

[1] Figures for 1927 and 1928 are state figures; those for earlier years are United States Bureau of the Census figures.

TABLE IV—Continued

YEAR	TUBERCULOSIS (ALL FORMS)			DIARRHEA AND ENTERITIS (UNDER TWO YEARS)			SMALLPOX		
	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO
1900	212.3	106.8	. .	. .	. .	. .	0.1	0.4	. .
1901	201.6	103.5	. .	. .	. .	. .	3.4	1.1	. .
1902	189.5	98.1	. .	. .	. .	. .	9.8	1.6	. .
1903	183.1	101.4	. .	. .	. .	. .	0.8	1.2	. .
1904	199.3	107.9	. .	. .	. .	. .	0.3	1.1	. .
1905	192.7	104.9	. .	. .	. .	. .	0.1	2.9	. .
1906	183.7	106.4	. .	. .	. .	. .	0.0	0.2	. .
1907	178.8	100.9	. .	109.6	54.7	. .	0.2	0.3	. .
1908	166.2	99.3	. .	106.8	83.3	. .	0.1	0.3	. .
1909	160.7	95.2	147.6	106.7	66.5	66.8	[2]	0.1	0.1
1910	162.7	97.6	150.8	121.7	83.1	84.5	0.0	4.2	0.3
1911	154.4	94.6	146.3	104.0	56.0	59.2	0.1	0.2	0.1
1912	148.1	90.9	135.4	94.9	46.6	60.6	0.1	0.1	[2]
1913	145.0	87.0	128.8	87.2	56.3	70.6	0.0	0.1	0.1
1914	143.1	87.3	126.1	82.4	52.3	54.0	[2]	0.1	0.3
1915	141.6	90.6	125.3	74.5	38.1	44.1	0.3	0.2	0.1
1916	149.2	92.7	126.4	68.1	62.3	59.5	0.0	0.1	0.1
1917	145.9	96.6	136.8	71.2	50.3	55.4	0.3	0.3	0.2
1918	159.0	101.5	136.2	76.8	48.7	48.6	0.0	0.5	0.4
1919	128.0	85.7	114.6	43.5	46.6	38.7	0.1	0.3	0.2
1920	113.8	83.6	102.8	47.5	47.4	31.8	0.1	0.3	0.3
1921	98.5	72.5	89.1	37.4	41.9	36.9	0.0	0.3	0.3
1922	93.8	68.0	85.8	30.0	26.8	21.7	0.0	0.5	0.1
1923	88.5	71.6	85.8	24.0	33.9	27.0	0.0	0.4	0.1
1924	85.6	72.9	81.9	20.7	23.5	17.6	[2]	5.6	1.0
1925	83.0	66.5	74.5	18.7	35.1	27.0	0.0	0.5	0.7
1926	83.5	69.4	76.8	19.3	23.3	22.9	0.0	0.1	0.0
1927	76.2	66.9	72.0	13.6	21.8	14.0	0.0	0.0	0.2
1928	72.3	67.6	70.7	13.2	17.1	14.0	0.0	[2]	[2]

[2] Less than one-tenth of one per cent.

TABLE IV—Concluded

YEAR	MEASLES			WHOOPING COUGH			INFANT MORTALITY[3]		
	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO
1900	11.6	13.2	. .	14.1	7.8	. .	. .	. .	. .
1901	8.0	3.1	. .	9.1	6.6	. .	. .	. .	. .
1902	11.5	9.4	. .	13.7	10.6	. .	. .	. .	. .
1903	9.3	6.9	. .	21.1	15.2	. .	. .	. .	. .
1904	8.7	7.5	. .	5.6	5.7	. .	. .	. .	. .
1905	8.4	4.0	. .	9.6	4.4	. .	. .	. .	. .
1906	10.9	9.7	. .	22.8	17.5	. .	. .	. .	. .
1907	8.5	9.2	. .	10.8	8.0	. .	. .	. .	. .
1908	15.0	4.4	. .	12.7	10.6	. .	. .	. .	. .
1909	7.8	9.6	5.3	12.0	7.6	6.3	. .	. .	. .
1910	11.6	9.0	16.4	8.5	10.9	12.3	. .	124.8	113.0
1911	8.9	6.8	6.4	14.8	8.4	11.3	. .	108.4	102.0
1912	11.3	3.8	8.1	9.7	8.2	8.7	. .	100.5	118.0
1913	14.1	8.2	13.3	8.6	8.9	13.3	. .	104.7	122.0
1914	5.6	5.6	4.6	8.4	9.1	7.2	. .	96.8	99.0
1915	7.5	3.2	4.1	12.9	7.2	6.7	101.0	85.6	91.0
1916	12.9	10.4	15.1	10.9	6.8	12.6	100.0	96.7	98.0
1917	10.1	8.0	10.4	6.3	10.6	10.8	98.0	89.5	92.0
1918	13.9	7.6	4.8	18.3	13.9	12.0	113.0	89.8	94.0
1919	4.9	5.2	3.5	8.5	5.2	4.4	88.0	89.9	90.0
1920	9.2	11.8	12.9	13.8	13.8	14.5	91.0	93.1	83.0
1921	4.7	1.8	2.5	5.2	8.5	8.7	76.0	79.0	75.0
1922	5.6	6.1	4.1	7.8	6.2	4.9	81.0	74.7	72.0
1923	8.5	7.1	9.8	12.4	8.6	8.5	78.0	80.4	75.0
1924	4.2	5.3	2.7	3.8	4.4	7.6	68.0	72.2	67.0
1925	8.4	1.7	1.3	6.7	6.3	5.8	73.0	75.8	70.0
1926	9.6	14.0	12.9	9.8	8.3	9.6	73.0	77.6	76.0
1927	2.0	1.5	0.5	3.5	4.6	4.1	65.0	67.8	62.0
1928	6.1	6.6	2.9	4.8	4.8	3.7	64.7	69.5	63.0

[3] Per 1,000 live births. Figures for 1910 to 1914 are state figures.

TABLE V

CERTAIN VITAL STATISTICS
MASSACHUSETTS, MICHIGAN, AND OHIO, 1927

	MASSACHUSETTS		MICHIGAN		OHIO	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
Live births[1]	82,273	19.3	99,941	22.7	123,541	19.0
Still-births[2]	2,997	36.3	3,834	36.9	4,884	38.0
Deaths, all causes[1]	49,324	11.6	50,600	11.5	73,466	11.3
Deaths:[3]						
Infants under one year	5,320	64.7	6,777	67.8	7,652	62.0
Infants under one month	3,033	36.9	4,054	40.6	([5])	([5])
Deaths:[4]						
All puerperal causes	486	5.9	661	6.4	764	5.9
Diarrhea and enteritis (under two years)	592	13.9	959	21.8	919	14.0
Measles	87	2.0	67	1.5	36	0.5
Whooping cough	149	3.5	201	4.6	270	4.1
Diphtheria	268	6.3	517	11.7	509	7.8
Typhoid fever	44	1.0	94	2.1	179	2.7
Scarlet fever	144	3.4	169	3.8	155	2.3
Tuberculosis, all forms	3,203	76.2	2,950	66.9	4,706	72.0
Tuberculosis, pulmonary	2,774	65.0	2,512	57.0	4,095	62.7
Smallpox	0	. .	0	. .	10	0.2
Poliomyelitis(acute anterior)	169	4.3	68	1.5	166	2.6
Encephalitis lethargica	61	2.1	54	1.2	119	1.8
Meningococcus meningitis	43	1.0	45	1.0	45	0.7

[1] Per 1,000 population. [2] Per 1,000 total births. In Massachusetts and Ohio, still-births are reported both as births and as deaths. [3] Per 1,000 live births. [4] Per 100,000 population. [5] No record.

Communicable Disease Control

MASSACHUSETTS

The Division of Communicable Disease in the Massachusetts Department of Health has charge not only of the common acute communicable diseases, but of the control of venereal disease, of the communicable disease diagnostic laboratory, and of the Subdivision of District Health Officers. The staff consists of a director (who is also Deputy Commissioner), the six district health officers, an epidemiologist, and twenty-five assistants (professional and clerical), a total of thirty-three. The activities of the Division are:

The investigation and supervision of all communicable diseases (except tuberculosis).

The study of the causes of diseases, sources of infection, and factors influencing the spread of disease.

The epidemiological studies of outbreaks of disease as well as the giving of advice and assistance to communities to stamp out any unusual prevalence of a disease.

The Division aids through its laboratory in the diagnosis of disease and conducts a substation for the distribution of biological products and arsenicals.

The State Department of Health has authority to define the diseases dangerous to the public health and is authorized to make investigations when such diseases exist. Physicians are required to notify immediately local boards of health of the existence of communicable disease cases, and those boards are required to notify the State Department of Health within twenty-four hours. The State Department has advisory and consultatory powers and has "coordinate powers as a board of health in every town with the board of health thereof." The State Department of Health has no

authority to make rules and regulations which all the state must observe, as is the case in many other states. The Department may draw up (and has done so) suggested minimum requirements in regard to communicable disease. The requirements become binding on local communities if the local boards adopt them and proceed in the manner set forth in the law by giving due notice in the newspapers, etc. The minimum requirements prepared by the Department have been adopted in about 60 per cent of the 355 health administrative units of the state and are followed in a number of others. These requirements are in accord with the best administrative practice for communicable disease control. The enforcement of rules and of quarantine rests with the local boards of health.

Health Districts

The state is divided into six districts and over each one of these districts there is a district health officer. Each officer is required to acquaint himself with his district, supervise its health needs, render aid to local health officers and boards in checking and preventing disease and in studying epidemics, and assist in controlling them. The service he renders his own district is similar to that of an epidemiologist, although there is a State Epidemiologist who has general supervision of all epidemiological investigations. Aid is given physicians by the district health officers and by the Epidemiologist in the diagnosis of doubtful communicable disease cases. The district health officers get duplicate copies of all reports of cases of communicable disease sent into the State Department by the local boards.

It is the practice of the Department to check laboratory reports and newspaper reports of cases against the reports

of cases received by the Department. There is also a partial check-up and comparison with shipments of biologicals.

Literature on some communicable diseases is available for distribution, but there is at present a lack of it for scarlet fever, whooping cough, and a few other diseases. A leaflet left at the time of the health officer's visit often proves helpful as a reminder of the precautions to be taken in case the family should forget some of the instructions given by the health officer. Epidemiological case histories are kept of all cases of typhoid, smallpox, poliomyelitis, and anthrax, and of all deaths from diphtheria, but not routinely of cases of diphtheria or scarlet fever. All relevant data are included in the reports. Spot maps and charts are prepared to show the incidence and trends of the main communicable diseases.

Control Practices

Control practices in regard to quarantine, isolation, placarding, cleansing, and general preventive measures are in general in accord with the best administrative control practices, even though each administrative district is a law unto itself. Usually the practices suggested by the state and advocated by the district health officers are followed in the local health administrative units.

Reciprocal notification of communicable disease is practised in Massachusetts, notice being sent the health authorities in other states when any case of communicable disease discovered appears to have had its origin in those other states.

Diphtheria control. Diphtheria cases are almost universally released from quarantine only after two negative cultures from nose and throat. Both diphtheria antitoxin and

toxin-antitoxin are supplied free. In 1927 enough toxin-antitoxin was sent out to give the three one c. c. doses to 103,981 persons.

Typhoid control. For typhoid cases the Department recommends two negative cultures of samples of stool and urine taken a week apart before the case is released from supervision. Whenever the Commissioner thinks it "necessary for the protection of the public health" to have a food-handler examined, he may do so according to Senate Bill No. 285 of 1928. Typhoid vaccine is supplied free, and enough was supplied in 1927 to vaccinate (three doses) 35,137 persons. An effort is made not only to check up on those who have recently recovered from typhoid but to discover probable typhoid carriers; sixty-five have been located in the state, thirteen of these in 1927. These have been induced to sign a statement agreeing to abstain from food-handling and to report from time to time. In 1927, of the total of 466 cases of typhoid, the sources of infection for 119 could be fairly definitely determined and were as follows: water, seven; milk, thirty-seven; foods, forty-three; contact, thirty-two.

Smallpox control. About 99 per cent of all susceptible contacts are vaccinated and kept under observation. The quarantine period for smallpox, as for other diseases, is fixed by local boards of health, and in general is twenty-one days, as suggested by the State Department of Health. Smallpox vaccine is supplied free, and all public school children must be vaccinated as a requirement for school attendance. A new enactment, 1929, includes private and parochial schools. In 1927 there were distributed 292,180 vaccine points, and the estimate is that not less than 90 per cent of all school children in the first grade have been vaccinated. In special emergencies local boards of health

may require and enforce vaccination of all inhabitants of their towns.

Scarlet fever control. The rules governing control of this disease are also local, but usually cases are quarantined for not less than twenty-eight days, and susceptible contacts are isolated for a week. Scarlet fever antitoxin is supplied free, but no wide-spread campaigns for the use of biologics against this disease have been started.

Ophthalmia neonatorum control. Cases of ophthalmia are to be reported, but there is no state requirement that a prophylactic must be used in the eyes of the new-born. In 1927 about 70,000 ampules of silver nitrate were distributed, enough to treat the eyes of about 40 per cent of the infants born that year.

Immunization and Prevention

Diphtheria immunization. Programs of immunization were carried out in 116 cities or in about one-third of the administrative health districts of the state. In these cities, 52,881 children were given the complete (three doses) treatment of toxin-antitoxin. From 1920 to 1927, 236,524 children were immunized, the great majority of these being in the six to eleven age-group. During this eight-year period, about one million children have outgrown the six to eleven age-group, so that of these nearly one-quarter may be presumed to be immune to diphtheria. The records of the biologic laboratory for 1927 showed 311,943 c.c.'s of toxin-antitoxin distributed, or enough to immunize over 100,000 persons.

Typhoid vaccination. Whenever a case of typhoid is discovered an effort is made to have all persons likely to be exposed protected by typhoid vaccine. In 1927, 32,913

complete treatments were sent out. The number of cases reported for that year was 466.

Smallpox vaccination. Only two cases of smallpox were reported in the state in 1927, but 292,180 vaccine points were distributed. School requirements and general educational campaigns result yearly in inducing thousands of vaccinations.

Consultation Visits

In 1927 the Division made about 125 consultation visits to aid physicians in the diagnosis of obscure cases of suspected communicable disease. Most of these visits were made by the district health officers. Some of these officers had failed to record their visits and the findings.

Diagnostic Laboratory

In Massachusetts the Diagnostic Laboratory established in 1895 is directed by the Division of Communicable Disease. The Laboratory is located in rooms adjoining the Department offices in the State House, and has a personnel of one director, four bacteriologists, two laboratory assistants, one laborer, and one clerk. There are no branch state diagnostic laboratories, and the state has no supervision over private laboratories. Senate Bill No. 285 of 1928 requires that laboratory examinations of fluids and secretions from food-handlers suspected of communicable disease must be made "at a laboratory approved by the Department." All kinds of laboratory work are done in the Diagnostic Laboratory except serological work on venereal disease (which is done at Harvard Medical School) and pathological work on cases or suspected cases of rabies. The Laboratory puts no limit on the amount of work done for any community, and all work

is done free. The results of all laboratory examinations are reported immediately to the Division of Communicable Disease. Where local laboratories do work for local boards of health, they report their findings to those boards. No laboratories make regular or special reports to the State Health Department except the Department's own laboratories. It is estimated that 92 per cent of all the people in the state can get reports on ordinary diagnostic laboratory examinations within twenty-four hours, and even the most remote parts in forty-eight hours. The Laboratory telephones or telegraphs reports of positive findings at the state's expense.

The number of examinations made in this Laboratory as well as in the special Diagnostic Laboratory at Harvard Medical School under the administration of the Division of Biologic Laboratories of the State Department is shown in Table XXI.

Some research work is being done in the Diagnostic Laboratory on undulant fever. All negative Widals are tested to determine if the case is one of undulant fever.

Provision is made in the law for the establishment of county bacteriological laboratories and, when such are established, they are subject to inspection by the State Department of Health.

Supervision of District Health Officers

There is no separate division or bureau in the Massachusetts State Department of Health that has charge of local health organization. The six district health officers give assistance to local organizations within their districts. The state law provides that the state should be divided for health purposes into not more than eight districts. Contact with these district health officers is maintained by the

director of the Communicable Disease Division, as a great deal of their work has to do with the control of communicable disease. Frequent conferences are held as well as communications by mail and telephone so that the State Department is kept informed of what is transpiring in the different districts.

MICHIGAN

In Michigan the section of the State Health Department in charge of communicable disease control is called the Bureau of Epidemiology. This Bureau has charge not only of communicable disease in general, but of venereal disease control, tuberculosis control, law enforcement, and local health organization. The Bureau is under the direction of the Deputy Commissioner. The staff consists of the director, three epidemiologists for field work, one law enforcement officer, two inspectors, one secretary, and two stenographers, a total staff of ten.

The activities of the Bureau in general are:

The organizing of full-time county units.

The aiding of local health departments in cities, towns, and villages.

The investigation of outbreaks of disease and the assisting of local health departments in controlling them.

The promoting of campaigns of prevention by vaccination, immunization, etc.

The checking up on known or suspected carriers of disease.

The furnishing of consultant and diagnostic service to physicians and boards of health in regard to communicable disease.

The investigation of complaints of nuisances, failure to report communicable disease, and failure of venereal disease cases to take or continue treatment.

The preparation of printed matter on communicable diseases and their control and prevention.

The Bureau operates through the authority conferred on the Commissioner to make rules and regulations, to enforce quarantine, and to adopt such measures as are considered necessary to protect the public health. Local health officers have power to enforce the state rules and regulations, but if they fail to do so the Commissioner may become the enforcing agent. Those of the Bureau having to do with epidemiology have been conducting campaigns for prevention of diphtheria and scarlet fever. The general policy is to have local physicians do the immunization work, the men from the State Department doing the demonstrational, promotional, and educational part of the work or aiding in it. Efforts are continually being made to have every case of communicable disease reported. All unusual outbreaks of communicable disease are investigated epidemiologically, and records are made of the findings. Spot maps are made and kept to indicate the incidence and trends of the different diseases. An arrangement with the Bureau of Records and Statistics has been made whereby the reports of all cases of communicable disease are received by that Bureau and daily tabulated. Records and tabulations are then submitted to the Bureau of Epidemiology with comments by the Records Bureau. In this way it is possible to check up on deaths from communicable diseases and to find out whether the case was reported before death and if so, how long before.

Control Practices

The control practices of the Bureau are in accord with the best public health practice.

Diphtheria control. Diphtheria cases must have two negative cultures from nose and throat before release. Contacts may be released on one negative culture or on the twenty-

first day after the establishment of quarantine. Diphtheria antitoxin is supplied free. For the year ending June 30, 1927, 545,610 c. c.'s were distributed, and 471,480 c. c.'s were distributed for the eight months following that date.

Typhoid control. For release from supervision, at least two negative cultures on stool specimens are required. Typhoid carriers must register and agree to abstain from food-handling. There were in 1928 twenty-seven typhoid carriers on the Department's register.

Smallpox control. Vaccination of school children is not compulsory, but is advised, and wherever smallpox occurs, an effort is made to have a general program of vaccination carried out. The rules of the Department require that all susceptible contacts be vaccinated or quarantined. The quarantine period is seventeen days. Smallpox vaccine has been supplied free since April, 1927. The percentage of school children vaccinated in different communities varies from zero to 100 per cent, with an average of about 70 per cent to 75 per cent.

Scarlet fever control. All cases of scarlet fever must be quarantined for not less than twenty-eight days, and all susceptible contacts must be quarantined for seven days but may be released to live elsewhere and if free from the disease at the end of seven days may be released from quarantine. At the close of 1927, campaigns for immunization against scarlet fever had been started in four counties, school children had been given the Dick test, and those found susceptible (30 to 50 per cent), a total of 2,500, had been given scarlet fever streptococcus toxin.

Ophthalmia neonatorum control. A state law requires the reporting of all cases of ophthalmia and the application of an approved prophylactic to the eyes of the new-born to prevent the disease. No cases were reported in 1927;

240,000 free treatments were sent out by the Department in that year, a quantity more than sufficient to treat the eyes of every infant born in 1927 (99,941 births).

Immunization and Prevention

Diphtheria immunization. The immunization program against diphtheria has been confined largely to school children. There are no figures to indicate exactly how many of these have been treated with toxin-antitoxin. A program was started in 1923, and by the end of 1927 enough toxin-antitoxin had been distributed by the State Department of Health to give the three doses to 645,000 children. Schick tests made in the state have shown that 70 per cent of those tested were susceptible to diphtheria. Ten counties have been covered quite thoroughly in the campaign. Local physicians administer the toxin-antitoxin.

Typhoid vaccination. No special campaigns have been carried on except where cases of typhoid occurred. In these areas, an effort has been made to get persons exposed or likely to be exposed to protect themselves and their families. Enough typhoid vaccine was sent out in 1927 to give the three treatments to 12,478 persons. There were 1,467 cases of typhoid reported in the state in 1927.

Smallpox vaccination. During 1927, 72,000 vaccine points were distributed to Detroit and 79,895 to the remainder of the state. Some vaccine has been purchased in different communities, so it is difficult to estimate the actual number of persons vaccinated. Efforts are made to have vaccination made general whenever cases occur, and considerable success has attended the effort, particularly in the western part of the state.

Epidemiological investigations. In eight months, July, 1927, to February, 1928, ninety-seven investigations had been

made, fifty-two of these in rural communities; the actual number of visits was 313 (207 of these being to rural places); the number of cases involved was 243 (177 in rural and sixty-six in urban districts). In addition to the epidemiological investigations, fifty-three consultant visits were made in 1927 to assist physicians and health officers in the diagnosis of cases of suspected communicable disease.

The Bureau of Epidemiology has recently been carrying on research work on undulant fever and is now studying the history of some thirty cases that have occurred in the state.

Reciprocal notification of communicable disease is practised with other states, and a new law (1929) in Michigan prohibits bringing into the state a case of communicable disease without permission of the State Department of Health.

Local Health Organization

This activity, which is under the direction of the Bureau of Epidemiology, has only recently come into prominence, although the Department of Health has always been endeavoring to assist local health officers and local boards of health in their problems. Recently an effort has been made to get organized full-time health service for rural communities as a step toward providing fairly adequate health service for all citizens of the state. Three counties have been organized with full-time service, namely, Saginaw, Oakland, and Wexford. A number of other counties are interested, so an active campaign is being kept up in the hope that similar service may be organized not only in the most prosperous counties, but in the more sparsely settled as well. In some cases, townships and villages individually have neither the population nor the wealth adequately to finance such service. Oakland County has a personnel of fifteen health workers in its unit with an annual budget of $70,000,

while Saginaw has a personnel of five with a budget of $12,000. Wexford, established in April, 1928, has a budget of $15,000. Legal provision for county health units was made by Act 306, Public Acts of 1927 (see page 19).

Law Enforcement

This function of the Bureau of Epidemiology is concerned mainly with securing complete statistical returns and reports of cases and with the enforcement of state laws or regulations governing public health. The officer immediately in charge is a member of the state police, but he is usually able to secure the desired results without resorting to prosecution. The Department is particularly successful in getting known venereal disease cases to start treatment or to continue it if they have allowed it to lapse.

OHIO

The staff of the Division of Communicable Disease consists of a chief, four health supervisors (who perform in part the function of district health officers), a statistician, two clerks, and a stenographer, a total of nine. In the Ohio Department, venereal disease is grouped with other communicable diseases, but tuberculosis is placed under the Division of Hygiene.

The principal activities of the Division of Communicable Disease are:

The supervision of control measures for communicable disease.
The aiding in diagnosis of suspected communicable disease cases.
Demonstrations in preventive measures.
The enforcement of state regulations.
The providing of literature on communicable disease and general information and consultant service.

The rules and regulations of the Public Health Council have the force of law and are applicable to the whole state. A local board of health may make and enforce such regulations as it "deems wise and necessary for the protection of the health of the people of the community."

Local health commissioners are required to report all cases of communicable disease to the State Department. The regular practice is to report once a week unless there is something of unusual significance. Quarantine measures are controlled by local boards of health and also by the State Department of Health.

The chief of the Division and the four health supervisors aid local health officers, local boards of health, and physicians where confirmation of diagnosis in questionable cases of communicable disease is desirable. The staff aims to do demonstrational and promotional work and to leave to local physicians the administration of preventive treatments. Educational work is carried on to obtain more complete reporting of cases of communicable disease.

The laboratory reports are checked against reports of cases of venereal disease and tuberculosis but not of other communicable diseases. Shipment of biologics cannot be used as a means of checking, as typhoid vaccines and silver nitrate for ophthalmia neonatorum are the only prophylactic preparations sent out by the State Department of Health. The Division makes an attempt to investigate every unusual outbreak of communicable disease in the state. It also makes available for local health departments, supplies of literature on communicable diseases.

The epidemiological records of investigations made by the Department contain the essential data usually included in such records, but many of the investigations are made locally by the health officers and are not so complete. In 1927 the

State Department officers made, according to office records, twenty-one epidemiological investigations. Of these, the most exhaustive was of acute anterior poliomyelitis. One health supervisor had been devoting months to this study; he had made sixty-three visits and investigated about 700 cases or suspected cases. In 1927, 1,170 cases of poliomyelitis were reported in the state with 167 deaths. The investigator found that many fairly definite cases had never been reported. The local health officers tend more and more to make fairly complete records of their work, as by doing so they find it much easier to supply the data required for their annual reports to the State Department of Health. Most local health officers keep spot maps and diagrams in their offices. The State Department of Health uses diagrams to show the general trends of communicable diseases, but very little use is made of spot maps to indicate the current incidence of these diseases.

Control Practices

Control practices for communicable disease are in line with approved public health practice.

Diphtheria control. Diphtheria cases are released only on two negative cultures from nose and throat taken at least forty-eight hours apart. Diphtheria antitoxin is not supplied free by the state, but each district board of health is required by law to furnish it free to its own district. There is no record to show how much diphtheria antitoxin was used in 1927. Fifty-two districts of a possible 181 reported that 133,554 school children had been immunized against diphtheria.

Typhoid and paratyphoid fever control. The state requirement is that the case shall be isolated "until recovery is complete and until typhoid and paratyphoid bacilli have

disappeared from the urine and stools." Typhoid carriers are to be "restricted in accordance with the instructions of the State Director of Health." There is no record of the number of carriers in the state. Typhoid vaccine is distributed free. In 1927, 19,273 c. c.'s were sent out by the Department.

Smallpox control. Only a small percentage of susceptible contacts are vaccinated (perhaps 5 to 10 per cent). The state rules require that a case of smallpox shall be isolated "until recovery is complete and desquamation has entirely ceased." "Exposed persons who refuse vaccination shall be quarantined seventeen days from date of last exposure." Exposed persons vaccinated within four days of exposure shall be kept under observation, but not in quarantine, for twelve days. If vaccination is performed after the four days, the persons are to be quarantined until the vaccination is pronounced successful, or until the seventeen days have expired. Vaccination of school children is not compulsory, though boards of education may legally require it for attendance at school.

Scarlet fever control. Cases of scarlet fever are isolated till complete recovery, the minimum period of isolation being thirty days. Exposed susceptible children are quarantined for at least seven days, when they may be released if free from disease and if they have been living for that time away from the case; otherwise, they are released at the same time as the case.

A small amount of immunization against scarlet fever (about 10,000 doses) was done in 1927 in the counties of Delaware and Cayuhoga.

Ophthalmia neonatorum control. Cases of ophthalmia must be reported within six hours of discovery; a fifty-cent fee is paid the one making the report. There is no state

requirement that a prophylactic shall be used in the eyes of the new-born, except where the birth takes place in a maternity home, a hospital, or a public or charitable institution. There were 1,417 cases of ophthalmia neonatorum reported in 1927. Silver nitrate prophylactic is supplied free. In 1927, 81,641 ampules were distributed, sufficient to treat the eyes of about two-thirds of the children born that year.

Immunization and Prevention

Diphtheria immunization. Reports show a number of immunizations, but it is impossible to say how many.

The comparison of a group of twenty-five counties in which no general programs have been carried out with a group of twenty counties that have carried out very definite programs in the last ten years, shows an increase of 109 per cent in the case rate for diphtheria in the former group and a decrease of 42 per cent in the latter group. The population of these two groups was about the same.

Typhoid vaccination. There are no figures to show how many persons were vaccinated against typhoid in 1927, but enough typhoid vaccine was sent out by the state to vaccinate 6,400 persons. There were 1,086 cases of typhoid reported in 1927, and an effort was made to have exposed persons vaccinated in the localities where the cases occurred.

Smallpox vaccination. There is no way of telling how many persons were vaccinated against smallpox in 1927. During the year 1,558 cases were reported and wherever they occurred the community was advised to practise general vaccination. In some communities such as Hancock County, as high as 90 per cent of the first-grade children were vaccinated, but this is an exception as in many places the percentage of the population protected is almost nil.

TABLE VI

LIST OF REPORTABLE DISEASES, MASSACHUSETTS, MICHIGAN, AND OHIO, 1928

DISEASE	REPORTABLE IN		
	MASS.	MICH.	OHIO[1]
Actinomycosis	yes	yes	no
Acute infective conjunctivitis (ophthalmia neonatorum)	yes	yes	yes
Ankylostomiasis	yes	yes	no
Anthrax	yes	yes	yes
Cerebro-spinal fever (meningococcus meningitis)	yes	yes	yes
Chancroid	no	yes	yes
Chickenpox	yes	yes	yes
Cholera (Asiatic)	yes	yes	yes
Dengue	no	yes	yes
Diphtheria (including croup)	yes	yes	yes
Dysentery (amoebic and bacillary)	yes	yes	yes
Encephalitis lethargica	yes	yes	yes
Erysipelas	no	yes	yes
Food poisoning	no	no	yes
Foot and mouth disease (in man)	no	no	yes
German measles	yes	yes	yes
Glanders	yes	yes	no
Gonorrhea	yes	yes	yes
Influenza (epidemic)	yes	yes	yes
Leprosy	yes	yes	no
Malaria	yes	yes	yes
Measles	yes	yes	yes

[1] In Ohio there is an additional list of reportable conditions, most of them forms of poisoning and usually classed as occupational diseases. These are: compressed air sickness, poisoning from aniline, arsenic, benzine, benzol, bisulphate of carbon, brass, carbon monoxide, dinitrobenzine, lead, mercury, naphtha, and natural gas.

TABLE VI—Continued

DISEASE	REPORTABLE IN		
	MASS.	MICH.	OHIO
Milk sickness	no	no	yes
Mumps	yes	yes	yes
Pellagra	yes	no	no
Paratyphoid fever	no	yes	yes
Plague	yes	yes	yes
Pneumonia (lobar or broncho)	yes	yes	yes
Poliomyelitis (infantile paralysis)	yes	yes	yes
Puerperal septicemia	no	no	yes
Rabies	[2]yes	[2]yes	[3]yes
Rocky mountain fever	no	yes	no
Scarlet fever	yes	yes	yes
Septic sore throat	yes	yes	yes
Smallpox	yes	yes	yes
Syphilis	yes	yes	yes
Tetanus	yes	yes	yes
Trachoma	yes	yes	yes
Trichinosis	yes	yes	yes
Tularemia	no	yes	yes
Typhoid fever	yes	yes	yes
Typhus fever	yes	yes	yes
Undulant fever	no	yes	yes
Vincent's angina	no	yes	no
Whooping cough	yes	yes	yes
Yellow fever	yes	yes	yes

[2] In man and animals.
[3] In man only.

Consultant Service

The four health supervisors as well as the chief are available for this service. Only forty-eight diagnostic visits were recorded in 1927, thirty of them in connection with poliomyelitis, but it was stated that nearly every epidemiological investigation involved consultant service.

Reciprocal notification of communicable disease is required by law between the health districts of the state.

TABLE VII

REPORTING OF CERTAIN COMMUNICABLE DISEASES AS COMPARED WITH NUMBER OF DEATHS MASSACHUSETTS, MICHIGAN, AND OHIO, 1927

DISEASE	DEATHS REPORTED			CASES REPORTED			CASES REPORTED PER DEATH		
	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO
Typhoid and paratyphoid	44	94	179	466	1,467	1,086	10.6	15.6	6.1
Tuberculosis, all forms	3,203	2,950	4,706	5,856	5,643	8,131	1.8	1.7	1.7
Diphtheria	268	517	509	4,750	4,574	7,137	17.7	8.8	14.0
Smallpox	0	0	10	2	581	1,558	. . .	. . .	155.8
Scarlet fever	144	169	155	16,546	10,986	14,357	114.9	65.0	92.6
Poliomyelitis	169	68	166	1,189	284	1,170	7.0	4.2	7.0
Meningococcus meningitis	43	45	45	75	139	460	1.7	3.1	10.2
Measles	87	67	36	13,498	8,311	5,404	155.1	124.0	150.1
Whooping cough	149	201	270	6,273	6,827	7,478	42.0	34.0	27.7

Note: According to federal estimates, in 1927 the populations of Massachusetts and Michigan were about equal while that of Ohio was about fifty per cent greater: Massachusetts, 4,269,283; Michigan, 4,400,000; Ohio, 6,514,675.

TABLE VIII

REPORTING OF CERTAIN COMMUNICABLE DISEASES AS COMPARED WITH NUMBER OF DEATHS
MASSACHUSETTS, MICHIGAN, AND OHIO, 1928

DISEASE	DEATHS REPORTED			CASES REPORTED			CASES REPORTED PER DEATH		
	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO
Typhoid and paratyphoid	36	83	133	310	388	931	8.6	4.6	7.0
Tuberculosis, all forms	3,127	3,108	4,691	5,360	5,885	8,600	1.7	1.9	1.8
Diphtheria	249	384	368	4,052	3,729	4,843	16.3	9.7	13.1
Smallpox	0	2	4	19	1,326	1,236	. . .	66.3	30.9
Scarlet fever	90	178	132	10,473	10,489	10,174	116.4	58.9	77.0
Poliomyelitis	65	27	73	434	77	291	6.6	2.9	4.0
Meningococcus meningitis	36	146	113	107	276	240	3.0	1.9	2.1
Measles	265	303	189	41,519	27,051	27,427	156.0	89.0	145.0
Whooping cough	208	219	248	8,023	9,700	9,236	38.5	42.2	37.3

TABLE IX

HOSPITALIZATION OF CERTAIN COMMUNICABLE DISEASES IN URBAN AND RURAL AREAS
MASSACHUSETTS, MICHIGAN, AND OHIO, 1927

By percentage of total cases reported

DISEASE	MASSACHUSETTS		MICHIGAN		OHIO	
	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
Typhoid fever	50.0	(1)	40.0	10.0	50.0	20.0
Diphtheria	25.0	35.0	20.0	5.0	20.0	5.0
Scarlet fever	12.0	30.0	1.0	(2)	19.0	2.0
Smallpox	50.0	(1)	1.0	(2)	35.0	1.0
Measles	(2)	6.0	. .	. .	. .	. .
Whooping cough	(2)	3.0	. .	. .	. .	. .
Poliomyelitis	13.0	30.0	. .	. .	. .	. .

Note: Percentages are approximate. Absence of figures means that there is no record.

[1] Included in urban.

[2] Less than one per cent.

Venereal Disease Control

MASSACHUSETTS

In Massachusetts a subdivision of the Communicable Disease Division gives special attention to this problem. The epidemiologist, a lawyer, a woman social worker, and a woman physician lecturer (part-time) have charge of the activities.

The general policy and program of the group are:

The extension of clinic facilities.
The inducing of infected persons to take treatment.
The conducting of educational programs.

Gonorrhea and syphilis are defined by the Department of Health as diseases dangerous to the public health and as reportable. They are to be reported at the earliest possible moment. Physicians must give a circular of instructions to each person who they have reason to believe has venereal disease, and a report by number must be made to the local board of health. The name is to be given to the local board if the patient fails to return for treatment within twenty-one days or proves himself a menace to the public health. The local board of health is required to forward daily to the State Health Department a statement of all venereal disease cases reported to it. Reports on chancroid cases are not required in Massachusetts. The report cards for syphilis and gonorrhea do not call for the giving of the source of infection when known, information which is often an aid in dealing with the venereal disease problem. Reporting of venereal disease in Massachusetts is regarded as being very incomplete, and no definite estimate of the number of cases can be made. An intensive survey is being made at Holyoke

(61,000 population) to determine if possible the incidence of the disease.

All prisoners committed to jail in Massachusetts for thirty days or more must be examined for venereal disease, and positive cases are not released until no longer in an infectious stage. The Department of Parole and Correction arranges for the parole of certain cases of venereal disease provided they continue treatment.

The Department of Health furnishes free prophylactic treatment for ophthalmia neonatorum, and the law requires prompt reporting (within six hours) of all cases of ophthalmia in the new-born but does not make the use of the prophylactic compulsory. In 1927 there were 1,827 cases of ophthalmia in the new-born reported, but the records did not show how many were of definite gonorrheal origin. There is prohibition of advertising, delivery, or distributing of any sealed packages or literature for the treatment of venereal disease except as specified by law.

Arsenicals and mercurials for the treatment of syphilis are supplied free to physicians and to institutions.

The Massachusetts Society for Social Hygiene, a voluntary organization directed by a woman physician, cooperates with the State Department of Health in venereal disease programs.

The number of venereal disease cases reported and clinic attendance are shown in Tables X and XI. In general, it would seem that the treatment provided for venereal disease cases is of a high standard, but as a whole very little is being done to solve the problem of venereal disease by discovering sources of infection and seeing that the number of such foci are reduced to a minimum. Much of this can be done and should be done by the local boards of health or by groups cooperating with them.

MICHIGAN

The activities to control venereal disease in Michigan are carried on by the Bureau of Epidemiology, three members of the Bureau giving special attention to this feature of communicable disease work. In Michigan, venereal disease is declared to be a communicable disease and is subject to the rules governing communicable disease in general. Reports of cases are to be made to the State Health Department, though these reports are declared not to be public records. The State Department is required to investigate all reports of venereal disease, all reports, too, of sources of infection, and must investigate every case of venereal disease in a juvenile under sixteen years of age, a school pupil, or an infant, whether under treatment or not. Indigents are treated free, the place of treatment being determined by the probate judge. Cases of syphilis may go to the State Hospital at Ann Arbor and be treated at state expense, or be treated locally and have the cost borne by the county. Indigent gonorrheal cases of females under twenty-one years go to Kalamazoo for free treatment by the state; if they are older and can be trusted to continue treatment, they may be treated at a local clinic. No hospitalization is provided for male gonorrheal cases, but special cases may have treatment provided by the county supervisors. The Bureau cooperates with police departments, social agencies, public health nurses, churches, hospitals, parent-teacher associations, and others. The only special appropriation by the state for venereal disease work is $25,000 for hospitalization.

Educational work is done by the Department of Health and the Joint Committee on Health Education (a large group including the State Medical Society, the State University, the Department of Public Instruction, etc.). The

program of this Committee is to give unbiased information on the venereal disease problem.

Cases of venereal disease are reported directly to the State Department of Health. The report contains the name and address of the case and must give the source of infection when known.

Arsenical preparations for the treatment of syphilis are supplied free for indigents or when the physician is receiving only a nominal fee for the treatment (not over five dollars).

Data on the number of cases of venereal disease reported, clinic registration, etc., will be found in Tables X and XI.

OHIO

In Ohio the bureau in charge of venereal disease control is part of the division in charge of communicable diseases. Its main functions are:

Compiling records of work done in the venereal disease clinics throughout the state.

Initiating preventive programs.

Giving information through speakers and by the use of printed matter.

A woman lecturer does most of this informational work, and, while others of the Division assist, she is really the only one who can be regarded as more or less definitely assigned to venereal disease work. In Ohio "each district board of health may provide for the free treatment of cases of gonorrhea, syphilis, and chancroid." It may also "establish and maintain clinics" and "may provide for the quarantining of such carriers of syphilis, gonorrhea, or chancroid" as the Director of Health may order. It is required to "use due diligence in the prevention of such venereal diseases."

It is unlawful in Ohio to print or distribute literature on self-treatment for venereal disease, and those persons licensed

to practise medicine in limited branches are not permitted to treat venereal disease cases.

The Ohio Sanitary Code declares venereal disease to be dangerous to the public health and therefore to be reported, investigated, and controlled like other communicable diseases. Persons suspected of having venereal disease may be examined by the local health commissioner or by a doctor appointed by him. In Ohio all known prostitutes and persons associating with them can be reasonably suspected of having venereal disease. All cases of venereal disease are to be reported by name, by initials, or by serial number, and reports require the giving when known of the probable source of infection. Reports of venereal disease cases are private and inaccessible to the public. All druggists selling to the public material for treatment of venereal disease must keep a record of the same, and this record is open for inspection by the local and state health commissioners.

Approved arsenicals are supplied free for the treatment of all indigent syphilitic cases. In Ohio no person with a venereal disease may knowingly infect another, either through sexual intercourse or by engaging in an occupation likely to make such infection possible. No physician shall give a certificate stating that a person is free from venereal disease unless he knows that it is not "to be used for solicitation for sexual intercourse." The State Department of Health cooperates with and has cooperation from many organizations in the state in educational programs on venereal disease, such as the Ohio Public Health Association, the Young Men's Christian Association, the Young Women's Christian Association, and the Parent-Teacher Association.

The Legislature makes a special appropriation for venereal disease control. Before January 1, 1927, the amount was $25,000 per year; since that date it is fixed at $17,500.

TABLE X

REPORTING OF CASES OF VENEREAL DISEASES, MASSACHUSETTS, MICHIGAN, AND OHIO, 1925-1928

DISEASE AND YEAR	MASSACHUSETTS		MICHIGAN		OHIO	
	Number of cases	Rate per 100,000 population	Number of cases	Rate per 100,000 population	Number of cases	Rate per 100,000 population
Gonorrhea—1925	5,192	124	10,660	250	4,927	76
1926	4,920	116	10,808	248	4,731	74
1927	4,294	101	9,318	211	4,176	64
1928	4,506	103	8,592	187	3,867	58
Syphilis—1925	2,147	52	14,668	344	6,091	93
1926	1,904	42	14,872	346	5,896	89
1927	1,666	39	15,713	351	5,578	85
1928	1,569	36	15,323	333	10,025	151
Chancroid—1925	....	....	104	....	626	....
1926	....	....	103	....	522	....
1927	....	....	107	....	371	....
1928	....	....	100	....	472	....

Note: Absence of figures means that there is no record.

TABLE XI

CLINIC SERVICE FOR VENEREAL DISEASES, MASSACHUSETTS, MICHIGAN, AND OHIO, 1927

	MASSACHUSETTS	MICHIGAN	OHIO
Number of clinics in state	15	15	33
Source of support	state	local support	local boards of health
Number of treatment centers in hospitals	37	[1]	[1]
Average number of sessions in each clinic per week	6	5	4
Number of night sessions (estimated)	34	30	18
Total clinic registration	9,449	50,992	19,945
New cases registered during year	5,658	6,351	10,125
Total number of visits to clinic	160,444	161,037	184,353
Charge for treating indigents	free	[2]nominal charge	[3]nominal charge
Number of cases discontinuing treatment before rendered noninfectious	1,285	[1]	6,429
Per cent of these induced to return to complete treatment	30.0	[4]	32.0

[1] No record.
[2] Arsenicals free.
[3] Material free.
[4] Exact figure unknown, but a large percentage.

Tuberculosis Control

MASSACHUSETTS

In the Massachusetts State Department of Health there is a separate division for activities in connection with tuberculosis, and this is the largest of all the divisions in the Department. Prior to 1920, tuberculosis control was included in the Division of Communicable Disease Control. The staff consists of a director, an office staff of thirty-three, and 761 others employed in the institutions under the management of the Division.

The activities of the Division are:

The management of four state sanatoriums and one cancer hospital.

The supervision of county and municipal tuberculosis hospitals and dispensaries.

The direction of the ten-year juvenile tuberculosis survey.

The payment of subsidy claims.

The keeping of tuberculosis records: morbidity, reports, and field work.

There are four state sanatoriums located at Rutland, North Reading (used exclusively for children), Lakeville, and Westfield. There is a state infirmary at Tewksbury (280 beds), but it is under the Department of Public Welfare and cares for cases of tuberculosis that have no legal residence in the state. The first tuberculosis sanatorium in the state was opened in 1898, and in 1916 the Legislature provided for a group of county tuberculosis hospitals. This was the year in which the Framingham, Massachusetts, demonstration was begun. In 1924, a state-wide program was started for the detection and arrest of tuberculosis in children. Massachusetts has no specific laws regarding tuberculosis

except the laws governing sanatoriums and dispensaries and the provision for the "ten-year program." A municipality may collect from the state $5.00 per week for each tuberculous patient in a municipal hospital, if the hospital is approved by the State Department of Health. County commissioners must provide tuberculosis hospitals for their counties or contract for the care of their tuberculous by other counties. Patients in the state sanatoriums pay $7.00 per week if able; if not, the city or municipality to which they belong pays $17.50 per week for adults and $7.00 for minors.

Dispensaries

Dispensaries for tuberculosis are required by law "in every city and town with a population of 50,000 or more." There are forty-six tuberculosis dispensaries in the state. They are licensed by the State Department of Health, and before a license is granted they have to meet certain requirements in regard to control and maintenance, supervision, number of rooms, equipment, service, staff, nursing facilities, and location. These dispensaries are local, not state, dispensaries. The Tuberculosis Division of the State Department of Health confines itself to conducting daily clinics at the state sanatoriums and to holding through the staffs of the state sanatoriums, monthly clinics at several cities in the state.

Hospitalization

Massachusetts has more than one hospital bed per annual death from tuberculosis available for the hospitalization of tuberculous cases. In 1927 there were 3,203 deaths from tuberculosis as against 3,555 beds in the state, distributed as shown in Table XII.

TABLE XII

HOSPITAL BEDS FOR THE TUBERCULOUS
MASSACHUSETTS, 1927

	HOSPITAL BEDS
Four state sanatoriums	1081
One state infirmary	280
Other state hospitals	426
Six county hospitals	604
Twenty municipal hospitals	1067
Private sanatoriums	97
Total	3555

In addition there is a U. S. Veterans' Hospital at Rutland with 420 beds, that cares for some cases of tuberculosis from the state.

The Ten-Year Program

In an effort to discover the beginnings of tuberculosis in the child before the condition has become pulmonary, the state began an examination of children, limiting the examination to the following groups:

Children 10 per cent or more underweight and underheight.
Contact cases in the home.
Cases considered by teachers or physicians to require special attention.

It was hoped thereby to discover malnourished children and early cases of tuberculosis and thus to reduce mortality and sources of infection.

By May, 1928, almost 75,000 children had been examined. A check-up on those examined in 1927 showed that 26.5 per cent were following the instructions given, 22 per cent were

following them partially, 49 per cent failed to observe them, while for about 3 per cent it was not known what was being done.

In 1927, it was decided to make an effort to examine all children rather than to confine the examination to certain groups. The examiners were able in that year to include in the examination about 10 per cent of all children in the communities visited. The program as a whole has now covered nearly three-fourths of the state, and as a result over 500 children who required special attention have been placed in sanatoriums, while, as already shown, hundreds of others are following more or less imperfectly the instructions given as a result of the examination.

The effort to discover cases early is commendable. In a recent survey of Boston, Dr. Haven Emerson and Dr. M. P. Horwood found that 16.7 per cent of tuberculosis deaths were reported as cases one month before death, and 19.7 per cent of them after death.

Aid has been given the campaign against tuberculosis by a voluntary organization, the Massachusetts Tuberculosis League. The League is supported by the sale of Christmas seals and cooperates actively with the state and local departments of health in campaigns against tuberculosis. The central organization of the League has a secretary, three office assistants, and a part-time shipping clerk. The League has twenty-eight affiliated local organizations throughout the state and operates on a budget of about $25,000. Its main activity has to do with health education in the grade and high schools. Literature is provided, lectures given, newspaper publicity used, and there is participation in all community efforts to control tuberculosis and reduce its incidence. Statistics on reporting, hospitalization, field nursing, etc., will be found in Table XV.

MICHIGAN

Tuberculosis control in Michigan is one of the functions of the Bureau of Epidemiology, but apart from the general procedures applicable to all communicable diseases no special tuberculosis program has been undertaken by the Department of Health. The reason for this is that the State Health Commissioner considers that the Michigan Tuberculosis Association (a voluntary organization) is carrying out a very satisfactory program, and there is no adequate reason for duplicating it by the Department, particularly since the secretary of the Association frequently confers with the Commissioner. The Association, too, is able to raise about $200,000 yearly for its program, whereas the Department of Health could hardly hope to get an appropriation for tuberculosis work equal to that sum. The Association's main objectives have been to get the state to provide for the care of tuberculous hospital cases, to have public health nurses in the counties, to get county tuberculosis hospitals established, and by literature and campaigns to create a disposition on the part of the people to stamp out tuberculosis.

Michigan has one state tuberculosis sanatorium with 228 beds at Howell; there are also ten county sanatoriums with a total capacity of 729 beds (four others unapproved with eighty-five beds), two city sanatoriums with 602 beds, and four private sanatoriums with 821 beds. There is in addition a hospital with 450 beds for the care of Michigan tuberculous soldiers at Battle Creek. This is really a state institution. The sanatoriums are fairly well distributed except in the northern part of the southern peninsula, which has few general facilities for public health work. Practically all the tuberculosis sanatoriums in the state

have been established within the last seven years. By Act 314, Public Acts of 1927, the local health officers must provide the necessary care, treatment, and hospitalization for tuberculous cases who are unable to pay. The expense is met by the county. By Act 177, Public Acts of 1925, county boards of supervisors in counties of over 30,000 population have authority to provide a county tuberculosis hospital.

No tuberculosis clinics or dispensaries are conducted by the State Department of Health. Some are conducted by the Michigan Tuberculosis Association and by local sanatoriums. In 1927, 746 persons were examined in the Michigan Tuberculosis Association clinics. Of these seventy-nine (9.4 per cent) were found to be positive, eighty-seven suspicious, and 580 negative. The state reimburses all approved hospitals that care for indigent tuberculous cases at the rate of one dollar a day whether the patient belongs to the municipality or not. The State Department of Health certifies to the claim and therefore has to inspect these hospitals to see if they meet state requirements.

The Michigan Department of Health has no nursing staff for tuberculosis work, but the Michigan Tuberculosis Association has fifteen nurses; the services of these nurses are usually sold to local communities, the policy being to stimulate communities to undertake and bear the expense of local tuberculosis work. Some general health surveys made in Michigan have indicated that about 2 per cent of industrial workers and 1 per cent of the average mixed population are tuberculous. Data on reporting, hospitalization, etc., of tuberculosis will be found in Table XV.

OHIO

In the Ohio State Department of Health, tuberculosis control is the function of one of the bureaus in the Division

of Hygiene. The main aim of the Bureau is to get better reporting of tuberculous cases and to get the cases under treatment. The Bureau holds clinics in different parts of the state but these are of an educational or demonstrational character. The policy of the Bureau is based on the belief that the practising physician, if not already fully competent, can at least readily be trained to diagnose tuberculosis, so the aim of the Bureau is to have local physicians do the tuberculosis work and carry out the Department's program. That this policy is getting results is shown by the fact that five years ago most reports of tuberculous cases came from clinics, whereas now they come from physicians. The approval of the local medical society is first obtained before the Bureau can hold a tuberculosis clinic. The Bureau diagnosticians are all tuberculosis hospital superintendents. There is a Tuberculosis Sanatorium at Mount Vernon for early pulmonary cases and for tuberculosis (all forms) in children. The cost of care is fixed by the sanatorium superintendent and is to be not less than $5.00 and not more than $25.00 per week. If the patient cannot pay the whole cost, the portion he is able to pay is determined by the Board of State Charities, and the balance is paid from the poor fund of the county to which the patient belongs.

A county with a population of 50,000 or over may provide its own tuberculosis hospital, or district hospitals may be established or contract may be made by one county for the care of its tuberculous patients in another county, if the State Department of Health gives its approval. The State Department of Health "has general supervision of county and district hospitals for tuberculosis," and must approve plans for proposed hospitals.

Dispensaries for tuberculosis may be established but only

with the approval and under the regulations of the State Department of Health.

The Ohio Public Health Association gives a great deal of assistance to tuberculosis work in the state, by aiding educational work and encouraging the establishment of sanatoriums and the provision of more adequate public health facilities.

The state Sanatorium at Mount Vernon has 239 beds. There are in the state, twenty-seven city, county, and district tuberculosis hospitals with beds for 2,771 patients. The total bed capacity in the state for tuberculous cases is therefore 3,010. The management of the State Sanatorium is under the Department of Public Welfare. The cost of operating it in 1927 was $1.83 per patient per day.

There are a number of state institutions such as reformatories and penitentiaries that have a few beds for tuberculous cases; fourteen institutions have, all told, 607 such beds.

The clinics conducted by the State Department are itinerant in character. In 1927, thirteen diagnostic chest clinics were held by the Bureau, at which 723 persons were examined and 113 of them given day nursing service. From 1922 to 1927, 7,055 persons were examined in the Bureau clinics, 1,708 of whom were found positive, 1,518 suspected, and 3,829 negative. Clinics of a permanent character are conducted by the local health departments. There are thirty-four of these in the state, and one more is conducted by the Ohio Public Health Association. In five of the largest cities in the state there are tuberculosis dispensaries.

TABLE XIII

NUMBER OF DEATHS FROM TUBERCULOSIS AND DEATH-RATES PER 100,000 POPULATION
MASSACHUSETTS, MICHIGAN, AND OHIO, 1925-1928

YEAR	FORM OF TUBERCULOSIS	MASSACHUSETTS		MICHIGAN		OHIO	
		DEATHS	RATE	DEATHS	RATE	DEATHS	RATE
1925	Pulmonary	2,883	. . .	2,410	. . . .	(1)	. . . .
	Other forms	576	. . . .	420	. . . .	(1)	. . . .
	Total	3,459	83.0	2,830	66.5	4,816	74.5
1926	Pulmonary	2,961	. . . .	2,601	. . . .	(1)	. . . .
	Other forms	555	. . . .	440	. . . .	(1)	. . . .
	Total	3,516	83.5	3,041	69.4	5,080	76.8
1927	Pulmonary	2,774	. . . .	2,512	. . . .	(1)	. . . .
	Other forms	429	. . . .	438	. . . .	(1)	. . . .
	Total	3,203	76.2	2,950	66.9	4,706	72.0
1928	Pulmonary	2,692	. . . .	2,647	. . . .	4,091	. . . .
	Other forms	435	. . . .	461	. . . .	600	. . . .
	Total	3,127	72.3	3,108	67.6	4,691	70.4

[1] No record.

TABLE XIV

NUMBER OF CASES OF TUBERCULOSIS REPORTED AND CASE RATES PER 100,000 POPULATION
MASSACHUSETTS, MICHIGAN, AND OHIO, 1925-1928

YEAR	FORM OF TUBERCULOSIS	MASSACHUSETTS		MICHIGAN		OHIO	
		CASES	RATE	CASES	RATE	CASES	RATE
1925	Pulmonary	5,385	....	....	....	....	....
	Other forms	825	....	....	....	....	....
	Total	6,210	149	5,785	136	7,570	117
1926	Pulmonary	5,444	....	....	....	....	....
	Other forms	874	....	....	....	....	....
	Total	6,318	150	5,387	122	7,456	111
1927	Pulmonary	5,049	....	....	....	....	....
	Other forms	807	....	....	....	....	....
	Total	5,856	138	5,643	111	8,131	124
1928	Pulmonary	4,873	....	....	....	....	....
	Other forms	487	....	....	....	....	....
	Total	5,360	130	5,885	128	8,600	130
Cases reported per death: 1927		1.8		1.7		1.7	
1928		1.7		1.9		1.8	

Note: Absence of figures means that there is no record.

TABLE XV

CARE OF TUBERCULOUS CASES, MASSACHUSETTS, MICHIGAN, AND OHIO, 1927

	MASSACHUSETTS	MICHIGAN	OHIO
Active cases of tuberculosis on register	9,730	[1]15,000	[1]17,000
Number of nursing visits to tuberculous cases:			
In towns and cities where there was no dispensary	[2]12,276	[3]	100,466
In other towns	[2]64,764	[3]	[4]
Number of visits to dispensaries or clinics	[5]16,945	[6]746	[3]
Number of new cases registered	[5]3,232	[3]	117
Total number of cases on clinic and dispensary registers	[5]13,950	[3]	1,205
Per cent of known tuberculous cases hospitalized	41.8	10.0	22.0
Mean number of days in sanatorium	255	120	110
Cost per patient per day	$2.54	$3.00	$2.86
Per cent of admissions under fifteen years of age	14.2	[3]	16.4
Per cent of cases minimal on admission	11.0	15.0	45.9
Number of preventoriums or summer camps	19	4	21
Approximate length of stay in camp in weeks	2–8	3–8	8
Attendance at summer camps	2,134	[7]341	1,600
Number of cities in which there are open air schools	5	17	7
Attendance at open air schools	354	[3]	1,987

[1] Estimated.
[2] No reports from Adams, Boston, Arlington, Everett, Gloucester, Medford, or Taunton.
[3] No record.
[4] Included in figure for cities where there was no dispensary.
[5] No reports from Boston or Everett.
[6] Report of the Michigan Tuberculosis Association only.
[7] No report from Northville.

Sanitary Engineering

MASSACHUSETTS

Dr. C. V. Chapin in his report of 1914 on state health departments stated that "undoubtedly the most important work of the Massachusetts Department of Health has been in connection with water supplies and sewage disposal and kindred matters."

An engineering division was first created in Massachusetts in 1886, called then the Division of Water Supply and Sewage; the Water and Sewage Laboratories and the Lawrence Experiment Station were established in 1887.

Since then the Division has continued to investigate, experiment, and advise regarding sanitary engineering problems, in accordance with the responsibilities entrusted to it at its creation in 1886.

The staff consists of a chief engineer, two associate sanitary engineers, one senior, two assistant, and three junior sanitary engineers, three senior sanitary engineering aides, and eleven clerks or stenographers, a staff of twenty-three, often augmented in summer by adding junior sanitary engineering aides.

The activities of the Division in general are limited to giving advice to cities and towns in regard to:

> Water supply, drainage, sewage and waste disposal, stream pollution, shellfish sanitation, and special sanitary engineering projects.

The powers vested in the Division are mainly advisory and are expressed in the report of the Massachusetts Drainage Commission of 1885 which stated that "we propose to clothe the Board with no other power than the power to examine, advise, and report except in cases of violation of the

TABLE XVI

INSPECTIONS MADE BY THE ENGINEERING DIVISION
MASSACHUSETTS, 1927

	NUMBER OF INSPECTIONS
Water, regular inspections	220
Water, special inspections	336
Sewerage inspections	38
Pollution investigations	10
Miscellaneous inspections	47

statutes." The closest relationship exists between the Engineering Division and the Water and Sewage Laboratories; otherwise it would have been impossible to carry out the many experiments that have been made.

The State Department of Health is authorized to make rules and regulations for the protection of the inland waters used as sources of public supply, and it may prohibit pollution "if in its judgment the public health so requires." No bottled water may be sold until the source and method of handling are approved by the Department. The law has, therefore, given the Department more authority in regard to water supply than in regard to most things with which it has to do. The Department may also order, after investigation and hearing, the abatement of an offensive trade and may prohibit the taking of shellfish from polluted waters. It can also issue orders in regard to the sale of natural ice that may be thought to be unsafe. The Division is called upon to carry out many special investigations directly entrusted to the Department of Health by the Legislature. The Department of Health has no authority to compel

municipalities to provide safe water supplies, but it can advise and recommend, and can assist in preventing pollution.

The following is the list of treatment plants for public water supplies in Massachusetts in June, 1928.

For purification or removal of organisms, odor, and taste:

Plants with mechanical sand filters:

Athol
Cambridge
Scituate

Plants with sand filters:

Athol
Lawrence
Ludlow
Northfield
Norwood
Southbridge
Springfield
West Springfield
Wakefield

For removal of iron:

Brookline
Lowell
Marblehead
Middleborough
Amesbury
Reading
Cohasset

For chlorinating of water supplies:

Amherst[1]
Cambridge
Dalton[1]
Framingham[1]
Greenfield
Holliston
Lawrence
Methuen
North Andover[1]
Peabody
Marlborough[1]
Randolph
Braintree[1]
Rockport[1]
Salem[1]
Stockbridge[1]
Wakefield
Woburn
South Hadley Falls
Adams

[1] Chlorinators used in emergency only.

There is no fixed rule as to how frequently water samples are to be examined and there is no stated interval between

inspections of purification plants and watersheds. The only plant in the state (at Lawrence) used for bacteria removal has analyses made daily; the other plants are for removal of odor, taste, color, iron, and organic matter.

There are no measures governing roadside water supplies; swimming pools are under local supervision; tourists camps, too, are under local rules and regulations.

For the installation of systems of water supply or sewage disposal, approval must be obtained from the Engineering Division of the Health Department.

The Department of Health can only advise regarding sewage disposal; it cannot compel the installation of any system, but it can recommend to the Legislature what action should be taken in any given case.

The outstanding problems for study at present before the Division are:

The effect of the disposal of sewage in Boston harbor and its estuaries.

The problem of sewage disposal in certain river valleys.

The Division devotes 75 to 80 per cent of its time to water supplies, but it is also doing educational work, and in conjunction with the laboratories, is almost constantly engaged in research on some phase of sanitary engineering. At present, a study is being made of the effect of certain waters on different kinds of piping, and of the effect of piping on water.

For statistical data on water supplies and sewerage, see Table XVIII.

MICHIGAN

The bureau having to do with sanitary engineering in the Michigan State Department of Health is designated as the Bureau of Engineering. The staff consists of a director,

four engineers, one inspector, and two clerk-stenographers, a total staff of eight.

The main activities of the Bureau are:

The examination and approval of plans for water and sewerage systems.

The designing and supervision of the construction of treatment plants.

The supervision of water and sewerage systems.

The inspection of school water supplies, roadside and railroad supplies.

The investigation of nuisances, the inspection of summer resorts, and the giving of advice regarding methods of improvement.

The Bureau of Sanitary Engineering was created in 1913, and at that date the State Department of Health was given power to make rules governing the operation of purification plants. The Department has authority to order any municipality to provide a safe water supply but cannot compel it to do so if the people vote adversely on a bond issue. If a public system already exists, the municipality cannot be compelled to establish a new one, but it can be urged to do so. The Department can compel any municipality, even in the face of an adverse vote on bonds, to install a chlorinator.

Water analyses are made at most treatment plants daily and findings reported monthly to the State Department. If anything goes wrong with the treatment plant, the State Department must be immediately notified. Inspections of watersheds are not general in Michigan. Purification plants are inspected twice a year by the State Department and more often if it is thought necessary. There are no state regulations in regard to ice supplies.

The following tables show the treatment, the source, and

the ownership of public water supplies in Michigan, as of February, 1928.

TREATMENT OF WATER	Number of plants	Number of municipalities served	Population	Percentage of state population
Filtration with chlorination	27	42	2,222,187	52.1
Chlorination alone	52	54	540,000	12.6

SOURCE OF SUPPLY	Number of sources	Population served	Per cent distribution
Ground	209	751,813	63.2
Surface	112	2,517,179	33.8
Ground and surface combined	10	58,337	3.0
Total	331	3,327,329	100.0

OWNERSHIP	Number of supplies	Per cent distribution
Municipal	291	87.9
Private	34	10.3
Combined	4	1.2
State[1]	1	.3
Federal[2]	1	.3
Total	331	100.0

[1] Military Camp. [2] Airport.

The Bureau endeavors to improve rural water supplies by educational programs and by furnishing free laboratory

service for the analysis of samples. Roadside supplies along the main thoroughfares receive a good deal of attention in Michigan. Signs are posted where supplies are found to be safe, and advice is given where the supply is suspicious or unsafe. Improvement is following the program carried out by the Bureau. The survey of roadside supplies has been going on since 1925. In that year, 63.7 per cent of samples were found safe, 36.3 per cent unsafe; in 1926, 76.3 per cent were found safe and 23.7 per cent unsafe; while in 1927, 83.6 per cent were found safe and 16.4 per cent unsafe.

For additional statistical data on water supplies and sewerage, see Table XVIII.

OHIO

The staff of the Division of Sanitary Engineering in Ohio consists of a chief engineer, a principal assistant engineer, nine assistant engineers, and four stenographers, a total staff of fifteen, exclusive of four in the Bureau of Plumbing, which is part of the Engineering Division.

The main activities of the Division are:

Water supplies and water purification.
Sewerage and sewage disposal.
Industrial wastes.
Stream pollution.
Plumbing inspection.

Ever since 1893, the control of public water supplies has been under the State Board of Health. Bottled waters are under the supervision of the Food and Drug Division of the Department of Agriculture.

The State Department of Health can compel a municipality to provide a safe water supply provided there is already in existence a public supply. Samples from surface public supplies are usually examined daily and where supplies are

chlorinated, examination is either daily or weekly. Where the source is ground water, samples are examined at varying intervals. Inspections of watersheds are made fairly regularly and are nearly all made by local municipalities. Purification plants are inspected once or twice a year by the Division and oftener if thought necessary. In 1927, 1,443 inspections of these plants were made.

Ice supplies are supervised by local authorities, though all ice for common carriers, like water, must be passed upon by the State Department of Health.

Rural Water Supplies

An extensive program to have samples of all roadside water supplies analyzed has been under way in the state; over 2,000 wells have already been inspected and sampled. Work has been done in forty-seven of the eighty-eight counties of the state and supplies have been approved in thirty-one counties; 169 supplies have been approved, 61 of these being under pressure, and 108 equipped with hand pumps. The "seal of safety" (a metal disc) is displayed on approved supplies. The work on roadside supplies is having a general educative influence in rural districts.

Prevention of Pollution of Water Supplies and Sewage Treatment

The State Department of Health in Ohio has greater control over the disposal of municipal and industrial wastes than have similar departments in most other states. The Department has power and authority to compel a municipality to make necessary changes in any sewage disposal plant that is not operating satisfactorily. The Department has been

TABLE XVII

PUBLIC WATER SUPPLIES, OHIO, 1928

TREATMENT OF WATER	CITIES			VILLAGES			[1]OTHER		TOTAL		
	Number with own plant	Number supplied from adjacent city	Population served	Number with own plant	Number supplied from adjacent city	Population served	Number with own plant	Population served	Number with own plant	Number supplied from adjacent city	Population served
Filtered	30	5	2,191,043	20	[2]55	132,032	8	16,000	58	60	2,339,075
Softened	12	0	507,850	9	6	22,634	0	0	21	6	530,484
Wells:											
Chlorinated	14	0	430,954	12	2	32,101	3	925	29	2	463,980
Iron removal plant	3	0	27,371	12	0	21,698	1	600	16	0	49,669
Untreated	27	0	301,005	158	2	241,458	24	5,575	209	2	548,038
Surface water:											
Chlorinated	2	0	14,625	2	0	1,116	2	375	6	0	16,116
Untreated	0	0	0	7	0	8,324	6	1,250	13	0	9,574
Total	88	5	3,472,848	220	[2]65	459,363	44	24,725	352	70	3,956,936

[1] Unincorporated communities or small portions of municipalities. [2] Includes one unincorporated community.

compelling the installation of filter plants and though eight villages still have untreated water, there are now no cities in the state with untreated surface water supplies. About 70 per cent of the total state population uses public supplies. Of the urban population, 75 per cent uses water from surface sources. There are no slow sand filters used in the state; mechanical filters are necessary on account of the excessive turbidity of the water.

The waters of Ohio are very hard, so that the softening of water by carbon dioxide and lime is very generally practised. There are at present eighty-two sewage treatment plants in the state and nine others in process of construction.

The enacting of the Sewer Rental Law in 1923 was a distinct forward step in solving sewage disposal problems in Ohio. This law prohibits the establishment of a sewage treatment plant until there is provision made through legislation for the raising of funds for the operation of the plant. This means that plants no longer stand idle because there are no funds to operate them. Already seventeen cities are operating under this new Sewer Rental Law.

The main aims of the Department of Health in regard to stream pollution are:

To prevent further pollution of water supplies.
To correct pollutions that have become nuisances.
To preserve those supplies not yet polluted.

The general policy is to have the manufacturing plants producing trade wastes solve their own problems, the Department of Health simply acting in an advisory capacity; and success seems to be following this policy in Ohio. In 1924 there were, according to a survey, twenty-four major foci of pollution and sixty-eight minor foci. Of the twenty-four there are now only two where action has not been taken

to abate the pollution and for fully two-thirds of the minor foci similar action has been taken.

There are no state rules regarding swimming pools, although the Division inspects a number of them. Tourist camps are inspected and approved. On July 1, 1928, there were 233 approved camps in the state. Definite rules set forth the requirements for approval, such as satisfactory site, water facilities, sewage and garbage disposal, and general equipment and management.

The Division cooperates with industries in research work on canning wastes, strawboard wastes, and acid iron wastes, but most of this work is done by the manufacturing establishments.

Chart 9, on the opposite page, is of special interest to students of public health, for two reasons:

(1) Although it does not indicate what portion of the reduction in typhoid fever death-rates in the states of Massachusetts, Michigan, and Ohio was due to improvements in water supplies, it does show a marked correlation *a*) in Massachusetts, between the fall in death-rate and the increase of population using public water supplies; *b*) in Michigan, between the fall in death-rate and the increase in the capacity of filtration plants; *c*) in Ohio between the fall in death-rate and the decrease in population using untreated water.

(2) It indicates approximately, on the basis of estimates made by the engineering division of each state, the time when definite improvement in water supplies began and the rate of progress in further improvements since that time. The chart should be studied in connection with Chart 4, page 26, showing the growth of population in the three states.

TABLE XVIII

DATA ON WATER SUPPLIES, SEWERAGE, ETC.
MASSACHUSETTS, MICHIGAN, AND OHIO, 1927

	MASS.	MICH.	OHIO
Population:			
Urban	4,045,883	2,728,000	2,138,101
Rural	213,400	1,672,000	4,387,780
Per cent of water supply meeting U. S. Treasury Department standards:			
Urban	100.0	90.0	99.0
Rural	25.0	80.0	10.0
Frequency of laboratory examination of water supplies:			
Urban	(1)	[2]daily	daily
Rural	....	irregular	(3)
Per cent of total population using public supplies	96.0	78.0	70.0
Per cent of total population satisfactorily served	96.0	78.0	73.0
Per cent of rural population using wells	100.0	95.0	100.0
Per cent of wells properly protected	25.0	65.0	10.0
Per cent of rural population using water from protected wells	20.0	65.0	10.0
Per cent of urban dwellings sewer connected	....	83.0	75.0
Per cent of urban population served by sanitary sewers	87.0	83.0	75.0

Note: Percentages are approximate. Absence of figures means that there is no record.

[1] Some supplies are examined daily, some twice a week, some monthly, and some three times a year.

[2] Where supplies are treated.

[3] No record. It is estimated that 80 per cent are never examined.

TABLE XVIII—Continued

	MASS.	MICH.	OHIO
Per cent of population using privies:			
Urban	8.0	10.0	20.0
Rural	50.0	70.0	90.0
Per cent of privies of approved sanitary condition:			
Urban	100.0	10.0	25.0
Rural	(4)	5.0	10.0
Per cent of privies flyproof	....	1.0	10.0
Per cent of population served by satisfactory sewage disposal:			
Urban	88.0	83.0	80.0
Rural	(4)	40.0	14.0

[4] Included in urban.

Public Health Laboratories

MASSACHUSETTS

In the Massachusetts State Department of Health the laboratory work is not all done by one section or group. There is a Division of Water and Sewage Laboratories and a Division of Biological Laboratories in addition to the Diagnostic Laboratories which are part of the structure for communicable disease control (see page 56 and also Table XXI).

Division of Water and Sewage Laboratories

The Division of Water and Sewage Laboratories is housed in the State House near the State Department of Health offices. It has a staff consisting of a director, a chief of water laboratories, six chemists, two bacteriologists, and seven assistants, a total of seventeen. In connection with the Division, there is an Experiment Station and Laboratory at Lawrence, Massachusetts. The State Board of Health Laboratories for Water and Sewage were established in 1885, the Experiment Station at Lawrence two years later. The Water and Sewage Laboratories and the Engineering Division are closely linked together in their work. The Laboratories are constantly engaged in sanitary, analytical, and research work. Examinations are made of water supplies from a variety of sources, and of sewage, effluents from plants, and trade wastes. Chemical examinations are made of air from sewers, textile mills, and factories. Examinations and tests are continually being made on the efficiency of certain types of treatment of water, sewage, industrial wastes, etc. During 1927 the Division of Water and Sewage Laboratories examined chemically, bacteriologically, or microscopically 22,979 samples. Research work has been

carried on during 1927 on hydrogen ion control of water filters and in regard to treatment of sewage, on the activated sludge process, efficiency of household septic tanks, removal of color from water, etc.

Ever since 1886 our knowledge of sanitary science has expanded and has been put on a surer foundation through the valuable experiments that have been carried out and the analyses made at these laboratories.

Division of Biological Laboratories

The Division of Biological Laboratories was established in 1914 and is located at Forest Hills. The special Diagnostic (Wassermann) Laboratory is located at Harvard Medical School.

At Forest Hills the staff consists of a director, an assistant director, two chemists, four bacteriologists, and thirty-one assistants. At the special Diagnostic Laboratory there are: a chief of laboratory, two bacteriologists, and eight others on the laboratory staff.

The Biological Laboratories manufacture and distribute the following:

> Diphtheria and scarlet fever streptococcus antitoxin, antimeningococcus serum and antipneumococcus serum, Schick test material, diphtheria toxin-antitoxin, typhoid vaccine, smallpox vaccine, and silver nitrate ampules.

The special Diagnostic Laboratory (Wassermann) does routine testing of sera by the Wassermann and Kahn methods, complement fixation tests for gonorrhea and glanders, and pathological examinations for rabies and some other diseases. Much academic educational work is done by the staff of this Division and promotional assistance is given to preventive programs throughout the state.

TABLE XIX

EXAMINATIONS AND ANALYSES, STATE HOUSE LABORATORIES AND LAWRENCE EXPERIMENT STATION, MASSACHUSETTS, 1927

State House Laboratories	*Number of examinations*
Samples from public water supplies:	
Surface waters	2,545
Ground waters	1,257
Samples from domestic wells, ice supplies, etc.	658
Samples from rivers	1,405
Samples in connection with special metropolitan water supply investigation	898
Samples from sewage disposal works:	
Sewages	475
Effluents	603
Samples of wastes and effluents from factories	77
Miscellaneous samples (partial analyses)	97
Microscopical examinations	3,387
Special examinations of water (including field work) for manganese, lead, copper, alkalinity and acidity, fats, dissolved oxygen, and carbonic acid.	2,087
Lawrence Experiment Station	
Chemical examinations on account of investigations concerning the disposal of domestic sewage and factory wastes, filtration and other treatment of water supplies, swimming pools, and the investigation of the Merrimac and other rivers	2,359
Mechanical and chemical examinations of sand	182
Bacterial examinations of water supplies, rivers, sewage, filter effluents, ice, swimming pools, wastes, etc.	4,593
Bacterial examination in connection with methods of purification of sewage and water	837
Bacterial examination of shellfish and sea waters	1,519
Total	22,979

Research work is being conducted on the effect of freezing on toxin-antitoxin, the refinement of diphtheria toxin and toxin-antitoxin, the production of toxoid, and a cholesterol-glycerol test for syphilis. All biologics produced at the Laboratory are furnished free.

Table XX shows the quantities of biologics distributed by the Massachusetts Division of Biological Laboratories in 1927.

TABLE XX

BIOLOGICS DISTRIBUTED BY THE BIOLOGICAL LABORATORIES MASSACHUSETTS, 1927

	NUMBER DISTRIBUTED FREE
Diphtheria antitoxin (1,000 dose units)	346,212
Schick outfits for fifty tests	5,492
Toxin-antitoxin (three one c. c. doses)	110,821
Smallpox vaccine virus, doses	294,983
Typhoid and paratyphoid vaccine (three one c. c. doses)	35,129
Scarlet fever streptococcus antitoxin (fifteen c. c. doses)	6,114
Silver nitrate ampules	61,486
Antimeningococcus serum (fifteen c. c. doses)	2,837
Antipneumococcus serum (100 c. c. doses)	185

Additional statistical data on laboratory work will be found in Table XXI.

MICHIGAN

The Bureau of Laboratories is the largest bureau in the Michigan State Department of Health. The staff consists of a director; two assistant directors of branch laboratories;

five assistant directors in charge of immunology, research, special investigations, biologic products, and bacteriology, respectively; four chemists; thirteen bacteriologists; four serologists; two technicians; thirteen clerks; and twenty-six laboratory workers—a total staff of seventy.

The main activities of the laboratories are:

Making examinations for physicians.

Manufacturing and distributing diphtheria antitoxin, toxin-antitoxin, Schick material, typhoid vaccine, scarlet fever toxin and antitoxin, silver nitrate ampules.

Purchasing and distributing free neoarsphenamine and smallpox vaccine.

Maintaining a division of technological research.

Conducting experiments in technical chemistry and bacteriology.

Teaching laboratory technique.

The state laws provide for the establishment of a Public Health Laboratory and of laboratory branches not to exceed three in number. At present, in addition to the Central Laboratory at Lansing, there is a branch laboratory at Houghton (Northern Peninsula) and another at Grand Rapids. The activities of the Bureau of Laboratories are:

Inducing localities to establish local laboratories that will be efficient and reliable.

Training laboratory personnel so that laboratory workers may be available.

Demonstrating the value of a public health laboratory to a locality by lending the services of a member of the staff to establish a local laboratory.

Food and drug laboratories in Michigan are under the Department of Agriculture and have no connection with the public health laboratories. The Bureau of Laboratories does bacteriological, serological, and chemical analysis in so

far as such analysis contributes to a diagnosis of communicable disease. All laboratory work is done free, except for special work like blood chemistry, medico-legal work, autogenous vaccines, and quantitative analysis of urine. The laboratory has 440 distributing stations for diphtheria antitoxin throughout the state, and any physician can obtain material from a local station or from the Central Laboratory.

Private laboratories are not licensed by the state, but all laboratories handling live organisms must register with the State Department of Health. Wassermann tests on children for adoption must be made in laboratories approved by the State Department of Health. Release from quarantine on the basis of negative laboratory tests is granted only where the tests are made in laboratories recognized by the State Department of Health.

There are eighty-eight laboratories in the state, about ten of them being commercial laboratories. Nearly all of the eighty-eight are well known to the director of the State Laboratory, and many of the workers in these local laboratories have been trained in the State Laboratory. No limit is put by the Laboratory on the amount of work done for any community. Laboratory findings are reported to the State Health Commissioner. No reports are received from local laboratories except in regard to communicable disease. Reports of such diseases (including laboratory reports) usually come through the health officer. Most parts of the state (99 per cent of the population) can have reports on laboratory examinations within twenty-four hours. This does not take into account occasional snow blockades in the northern part of the state. All positive reports on diphtheria are telegraphed or telephoned as soon as the examination is completed.

The Michigan Laboratory has become widely known through its routine as well as its research work. It was at this Laboratory that the Kahn precipitation test for syphilis was worked out. In addition to the work on the serum diagnosis of syphilis, research is being conducted on the bacteriophage, on bacterial vaccine, on therapeutics, and on special technical problems.

The Central Laboratory is comfortably housed in the State Office Building at Lansing and there is evidence from the financial support given it, and the personnel and equipment provided, that the laboratories occupy a large place in the thought of physicians, legislators, and public health workers. In 1927, the Laboratory distributed 12,478 complete treatments of typhoid vaccine and 231,970 smallpox vaccine points. Since the antidiphtheria program was started in 1923, enough toxin-antitoxin has been sent out to give the three one c. c. doses to 645,000 persons.

Statistical data on laboratory activities will be found in Table XXI.

OHIO

The Division of Laboratories of the Ohio State Department of Health has its laboratory building located on the Ohio State University campus; the staff consists of a chief, ten chemists, one serologist, eleven bacteriologists, and sixteen other helpers, a total staff of thirty-nine.

The activities of the Division may be grouped under the following heads:

Administration.
Bacteriological diagnosis (all ordinary laboratory diagnoses).
Serological diagnosis for syphilis.
Chemical analysis of water, sewage, foods, drugs, etc.

A good deal of the time of the Laboratory is given to analysis of stock foods for the State Department of Agriculture and analysis of liquors for the Prohibition Department.

Authority is given by law for the establishment of a State Laboratory, the Director of Health to be in charge of the Laboratory. Authority is also given district boards of health to establish laboratories or, where approved by the Director of Health, to contract for laboratory service with an existing laboratory. The rule of the Department of Health is that "all cultures taken for the purpose of diagnosis or release (for diphtheria) shall be examined in a laboratory approved by the State Director of Health."

There are many local laboratories in the cities of the state but they are not branches of the State Laboratory. There is no relationship between private laboratories and the State Department of Health except as indicated above. Private laboratories are not licensed. In 1928 there were forty-seven private laboratories, sixty-two semi-public health laboratories, and twenty-five public health laboratories in state. The semi-public health laboratories make analyses the of milk and water and in some cases do diagnostic work on diphtheria. The only products manufactured by the Ohio Public Health Laboratory are typhoid vaccine and silver nitrate ampules. These are supplied free. All laboratory work is also done free. All other biologics are purchased and made available for physicians and boards of health and other authorized parties at a special price. Biological supplies used for indigents are furnished free by the municipality. There is no limit put upon the quantity of work done by the Laboratory for any community. It is estimated that about 90 per cent of the state population has adequate, satisfactory laboratory service. No reports from private laboratories come directly

to the Health Department, but reports on laboratory work do come through the annual reports from health districts. It is stated that about 75 per cent of the population in the state can have reports on laboratory examinations in twenty-four hours. All positive reports are telephoned or telegraphed upon request. The State Public Health Laboratory reports promptly its findings on all cases to the Director of Health.

Some research work is being done on the bacteriophage, on a detoxified typhoid vaccine, on industrial wastes, and on a comparison of the Kahn and Wassermann tests for syphilis.

In 1927 the Laboratory sent out 19,273 c. c.'s of typhoid vaccine and 81,641 ampules of silver nitrate solution (each ampule containing eight to ten drops).

TABLE XXI

EXAMINATIONS MADE IN THE STATE DEPARTMENT OF HEALTH LABORATORIES, MASSACHUSETTS, MICHIGAN, AND OHIO, 1927

	MASS.	MICH.	OHIO
Water:			
Chemical	2,359	3,105	164
Bacterial	12,193	6,851	6,865
Special lead, copper, etc	2,087	. . . .	. . . .
Microscopic	3,387	. . . .	. . . .
Milk:			
Bacterial	[1]9,000	12,218	45
Chemical	. . . .	10,995	28
Food and drugs	[1]1,600	(2)	467
Shellfish	1,519	. . . .	. . . .
Pathological	20	(3)	. . . .

Note: Absence of figures means that there is no record.

[1] Examinations are made by the Division of Food and Drugs.

[2] Examinations are made by the Department of Agriculture.

[3] Examinations are made by the consultant pathologist at Detroit.

TABLE XXI—Continued

	MASS.	MICH.	OHIO
Typhoid:			
Widal	2,079	829	1,671
Other cultures	3,007	423	. . . .
Tuberculosis—sputum	4,585	11,709	5,493
Diphtheria	16,510	24,572	12,092
Syphilis:			
Darkfield	. . . .	26	. . . .
Wassermann	67,699	171	138,687
Kahn	2,644	83,367	66,841
Colloidal tests	35	. . . .	. . . .
Gonorrhea:			
Smears	5,629	25,525	15,814
Complement fixation	1,409	. . . .	. . . .
Malaria	44	2,454	43
Undulant fever	387	254	33
Rabies	510	[4]	2,164
Pneumococcus typing	411	. . . .	. . . .
Tularemia	. . . .	. . . .	35
Glanders	15	. . . .	. . . .
Urine	. . . .	7,324	173
Feces	. . . .	2,942	586
Other	2,594	44,954	[5]7,331
Total	200,596	226,724	258,550

[4] Examinations are made at the University of Michigan.
[5] Mostly stock foods.

Division of Hygiene

The organization and designation by title of those branches of the State Health Departments that have to do with hygiene, child hygiene, and public health nursing vary widely in the three states.

MASSACHUSETTS

In the State Department of Health of Massachusetts there is a Division of Hygiene that is responsible for all activities that in other states may be grouped under such titles as "hygiene of the child," "public health nursing," and "public health education."

The staff consists of a director and twenty-seven assistants (physicians, nurses, nutritionists, dental hygienists, public health education workers, and clerks and stenographers).

The functions of the Division include:

Efforts to reduce infant mortality and maternal mortality.
Programs to improve and extend child hygiene, adult hygiene, public health nursing, nutrition, and mouth hygiene.
Educational work in the form of lectures, exhibits, demonstrations, publications, and a public health library.

The Division was created in 1915 in an effort to reduce infant mortality and promote child hygiene. Some of the means used to obtain results have been: well-child conferences, educational programs, and establishment of child conservation committees. Nutritional work and dental hygiene have also come to have an important place in the program.

Maternal and Prenatal Hygiene

To this particular activity a physician and four public health nurses devote their full time. The state is divided

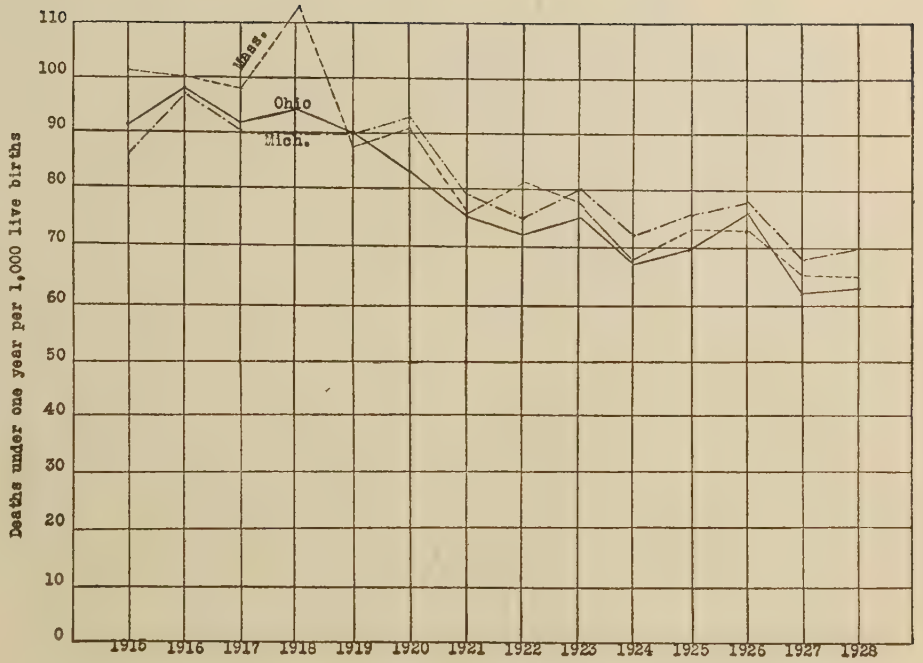


CHART 10. INFANT MORTALITY RATES PER 1,000 LIVE BIRTHS IN MASSACHUSETTS, MICHIGAN, AND OHIO, 1915–1928

into four districts, with a nurse in charge of activities for each district. Demonstration well-child conferences are held at different points in the state. These workers also prepare data and information on maternal and infant hygiene. No case work or clinical work is done by these nurses; the policy of the Division is to cultivate local facilities for the doing of such work. There is no special legislation in regard to maternity or prenatal hygiene in Massachusetts.

There are 213 lying-in hospitals licensed by the Department of Public Welfare. Local boards of health must certify such hospitals before they are licensed. The inspection of these hospitals is done by the Department of Public Welfare, although the local police departments and local boards of health have also the right to inspect them. The state is well supplied with lying-in hospitals except on the Cape Cod peninsula. Infant boarding homes, of which there are about 500, are also licensed by the Department of Public Welfare. There is no recognition of midwives in Massachusetts, and the state does not participate in the federal aid (Sheppard-Towner Act) for infancy and maternity.

Expectant mothers become known to the Division through physicians, visiting nurse associations, and others, and when known, nine prenatal and twenty-four postnatal letters are sent to them. In 1927, prenatal letters were sent to 868 mothers and postnatal to 8,278 mothers. Letters were also sent to 7,088 mothers of children between one and two years of age. The estimate is that from 35 to 75 per cent of births were under prenatal supervision. The average number of visits by nurses for prenatal care was four per case.

In 1927, about 50 per cent (41,029) of the 82,273 births in the state occurred in hospitals.

Infant Hygiene

It is estimated that in 1927 over 6,000 clinic sessions for infants were held in the state, but the number of infants attending is not known. The general policy is to have infants taken to the family physician and to have local communities conduct their own clinics. Of 165 towns where conferences have been held in the three years (1925-1927), forty-one have started clinics of their own. The average number of field nursing visits per infant for the state is about three. Birth certificates are not issued by the Department of Health, vital statistics being under the direction of the Secretary of State. The State Department has a great deal of literature suitable for child hygiene work, and this is generously distributed. Conferences on infant welfare have been held in various localities, the total population of which represent about 90 per cent of the state population; 13 per cent of these conferences were conducted by nurses and 87 per cent by physicians.

Preschool Hygiene

There is no special program for the preschool child as distinguished from that adopted for the infant, except that for the former some prominence is given to mental hygiene and use is made of information supplied by the State Department of Mental Disease.

School Hygiene

Every city and every town in Massachusetts is now required by law to have a school physician and school nursing service, although towns of less than a million dollars' valuation may be exempted from the requirement by the Department of Education. In towns, these services are provided by the schools; in cities, the board of health may provide them,

but if it fails to do so the school committee may supply them. Boston was the first city in the United States to establish (in 1894) a system of daily medical inspection in public and also in parochial schools.

The work of the Division of Hygiene in Massachusetts for the schools is in charge of a full-time physician, a nursing consultant, and the four child hygiene nurses already mentioned. This group visits local communities, holds conferences, and makes surveys, aiding and cooperating closely with the State Department of Education and with local workers. Physical education in the schools is under the State Department of Education. The Division aids the health education program in the schools through supplying the services of a teacher of art who goes from school to school using health subjects as the basis of her sketches. Any municipal money spent for clinics in Massachusetts must be spent under the direction of the local board of health, and all such clinics must be conducted according to the rules of that board.

There are now 180 towns and cities in Massachusetts that conduct dental clinics. The sanitation of school buildings in Massachusetts is under the Department of Safety, but the law says the Department of Health may make inspections. Inspection of the buildings is usually made by school physicians and nurses. The school buildings in Massachusetts are almost uniformly good. Very few one-room schools now exist; one-fifth of the entire school population in the state is housed in school buildings built within the last five years. It is estimated that 98 per cent of the schools have safe and protected water supplies and over 90 per cent have adequate lavatory facilities and sanitary toilets.

For summary and additional data on school health activities and facilities, see Table XXII.

Subdivision on Nutrition

A consultant and four assistants give instruction in nutrition to nurses and teachers and aid in the underweight clinics of the Tuberculosis Division.

Subdivision on Dental Hygiene

The work of this subdivision is done by a consultant dental hygienist who must be a graduate of science or arts and be well versed in nutrition. She forms a link-up with the dentists, prepares educational material, and gives courses to dental hygienists. The Department of Health has adopted a definite "dental policy" in regard to dental hygiene and a definite program, which is approved by the State Dental Advisory Committee. The nature of the program is mainly educational, to induce all people to give proper attention to dental hygiene. There were, in 1928, 213 dentists and forty-eight dental hygienists at work in the schools of the state, those of Boston excepted.

Subdivision of Public Health Education

The Subdivision of Public Health Education is grouped under the Division of Hygiene in the Massachusetts Department of Health. It will be referred to in the section on popular health instruction (page 139).

Public Health Nursing

There is no definite division or subdivision dealing with public health nursing in the Massachusetts Department of Health. The activities of the nursing staff are grouped under the Division of Hygiene. The four field nurses already mentioned establish contact with school nurses and act in an advisory capacity to them. There were 1,280 public health

nurses in the state in 1928, if all school nurses are counted. There are no special laws governing public health nursing, except the authorization of the employment of district nurses and the requirement that school nurses shall be employed. The relationship of the State Department of Health to public health nurses is advisory. Some of the public health nurses report regularly to the Department's nurse in their districts. There are no statutory requirements for public health nurses, but in the cities, nurses are under civil service. There are, all told, ten nurses in the State Department of Health, five of these in the Hygiene Division and five in the Tuberculosis Division. Public health nurses in general do no bedside nursing, but those identified with the visiting nurse associations may divide their time between public health and bedside nursing.

MICHIGAN

In the Michigan State Department of Health, the Bureau of Child Hygiene and Public Health Nursing is the title of the group that has charge of child hygiene and associated activities. The staff consists of a director (a physician), an assistant director, two field physicians, two directors of nursing districts, three instructors for little mothers' leagues, one clinic nurse, two field nurses, and five clerk-stenographers, a total staff of seventeen.

The main activities of the Bureau are:

Assisting communities to organize health centers.
Organizing mothers' classes and little mothers' league classes.
Making surveys.
Supervising midwives.
Supervising public health nursing.
Preparing literature for mothers and expectant mothers.

The Bureau was organized in 1925 and receives some of its support ($34,000 per year) from federal funds (Sheppard-Towner Act).

Maternal and Prenatal Hygiene

One physician, two prenatal nurses, and one women's class teacher give special attention to this activity. Classes are conducted for prenatal cases, and at the close of the classes a clinic is held and prenatal examinations offered. This is done at all the permanent health centers, of which there are seventy-nine in the state. In the more sparsely settled northern portions of the state, facilities for such examinations are limited. Lying-in hospitals are licensed in Michigan by the State Department of Public Welfare. There are 207 such hospitals (1,971 beds) in the state, twenty-five of them (590 beds) being in Detroit. The bed capacity is sufficient to care for about 50 per cent of the births. Midwives are not licensed, but they attend 3.4 per cent of the births in Michigan. No systematic supervision or instruction is given them, except in some of the cities, although as opportunity presents itself the public health nurses give them some supervision and instruction.

Prenatal Nursing Service

The number of births under prenatal supervision is not known. In the urban areas the percentage under supervision is about double what it is in the rural areas. In a recent study of 480 maternal deaths (rural and urban), 273 of the women had had no prenatal nursing attendance (which also means no prenatal medical service), and seventy-eight others had had only irregular nursing service. The average number of nursing visits to a case is two; about 70 per cent of mothers make contact with a physician or clinic before confinement, but only about 25 per cent put themselves definitely under a

physician's care. Fifteen per cent of the deliveries were in hospitals. Efforts are made by the Bureau to obtain the names of expectant mothers through nurses, physicians, and women's groups. Ten letters are sent out at different intervals giving the mother the information it is thought she ought to have.

In the last few years both infant and maternity mortality rates have been greatly reduced. In the year 1927, following cooperation with the Children's Bureau, the former rate was reduced 12.5 per cent and the latter 24.9 per cent.

Infant Hygiene

A physician, two prenatal nurses, and three other nurses give special attention to this activity, which deals with little mothers' league classes, women's classes, study clubs, and health centers. The prenatal nurse gives attention to the infant for the first six weeks of life. The special features stressed are nutrition, immunization, examination, habit formation, correction of defects, and general instruction. All births must be registered, and a prophylactic must be used in the eyes of the new-born. Infant homes and orphanages are licensed by the State Department of Public Welfare. Most of the infant clinics in the state are conducted by local communities; the Bureau conducts them only at the request of the local medical society. From July, 1926, to April, 1927, the Bureau conducted 141 clinics for 2,711 infants. Efforts are made to get parents to take their infants to the family physician. The seventy-nine health centers for infants are fairly well distributed over the state. In 1927, staff nurses made 3,529 visits on behalf of infants and preschool children. It is thought that 25 to 35 per cent of the mothers put their infants under regular medical care. As soon as a birth is registered, a certificate from the State Department of Health

is sent to the mother, together with suitable literature on child care.

Preschool Hygiene

The preschool child is included with the infant in the general program. All visits made on behalf of this group are included under infant hygiene. It is estimated that 20 to 30 per cent of mothers take their preschool children, more or less regularly, to a physician or a clinic.

School Hygiene

There is no program of school hygiene carried out by the State Department of Health except programs of immunization against diphtheria, scarlet fever, and smallpox, and no bureau in the Department is giving special attention to a school program. The Bureau of Mouth Hygiene does considerable educational work in the schools, but the general school health program is under the Department of Education and is aided by the Michigan Tuberculosis Association. There is no state law requiring physical examinations of school children, but there is a law requiring that in all places of 3,000 population or over, a program of physical education shall be provided for the schools. The law requires, too, the teaching in every public school of the principal modes by which communicable diseases are spread. For all interscholastic athletic contests, pupils must be examined by a physician; this means that about 80 per cent of the urban pupils and 40 per cent of the rural school pupils are examined. The local health officer is required by law to inspect all schools in regard to water supplies and general sanitary conditions, but nothing is stated as to the frequency of inspections. There is no state law fixing the amount of time to be devoted in the schools to health instruction; the

Department of Education, however, recommends thirty minutes per school day. Additional data on school health activities will be found in Table XXII.

Public Health Nursing

The staff in charge of public health nursing is the same as the one in charge of child hygiene. Provision is made in the law for the employment of public health nurses, and all such must report to the State Department of Health and comply with its regulations. The State Department of Health has no legal supervision over these or over school nurses, but the required reports give the Department contact with them. Public health nurses must be graduate nurses who have had at least four months' school training in public health nursing or eight months' experience in public health nursing under public health supervision. There are nine public health nurses on the Bureau's staff. There are 383 public health nurses at work in the state, forty-seven of these doing rural work in thirty-two counties. The northern portion of the lower peninsula in Michigan is the section of the state least well provided with public health nursing service.

OHIO

In the Ohio State Department of Health there is a Division of Child Hygiene and a Division of Hygiene, the latter having to do with tuberculosis and hospitals.

The staff of the Division of Child Hygiene consists of a chief, two lecturers, a maternity hospital inspector, an instructional nurse, eight field nurses, three other nurses, a statistician, a clerk, and two motion picture operators and clerks, a total staff of twenty.

The Division encourages local organizations to establish

their own services, and in the past two years the amount of work assumed by local communities has been doubled. The services of an experienced nurse are given to a community for a year on a basis of a fifty-fifty assumption of cost, the object being to demonstrate the value of such service and to have the community assume full responsibility for it. Of fourteen communities where this has been done, twelve have assumed full responsibility for the cost of maintenance.

The activities of the Division are:

Providing public health nurses for temporary periods to stimulate interest in a child health program.
Conducting prenatal, infant, and preschool conferences and demonstrations.
Organizing health builders' leagues.
Lecturing to medical societies and to the public.
Supervising maternity hospitals.

Maternal and Prenatal Hygiene

Ohio has been cooperating with the Federal Children's Bureau, U. S. Department of Labor (Sheppard-Towner Act), since 1921 and receives yearly $32,500 from that source. The members of the staff doing duty for this activity do not make prenatal examinations, the policy being to get expectant mothers to have such examinations made by the family physician. Maternity hospitals are licensed in Ohio by the State Department of Health. Maternity beds totaling 2,962 are provided in 200 hospitals in the state, a sufficient number to provide hospital accommodations for average hospital stay for about 60 per cent of the births. Midwives attend about 6 per cent of the total births and are licensed by the State Medical Board of Examiners, but they have no supervision except the small amount given by public health nurses. Midwives have to restrict their practice to the limited services authorized by their certificates. They must report births and

cases of communicable disease, including ophthalmia neonatorum. About 10 per cent of births in Ohio in 1927 were under prenatal nursing supervision. The nursing visits per case averaged 2.7 in rural and 4.1 in urban districts. At least 26 per cent of the births in 1927 occurred in hospitals; 1,392 of the 4,884 still-births and 2,347 of the 7,652 total infant deaths took place in hospitals. Efforts are made by the Division to learn of expectant mothers through nurses, physicians, and other agencies.

Literature distributed by local health departments is available for these mothers.

Infant Hygiene

This activity is included with prenatal hygiene in the general program. There are a number of health centers in the state, but any clinics held at such centers or elsewhere are first approved by the local medical society. The educational campaign aims to have infants taken to the family physician, but as yet only limited success has attended the efforts to have this done. Infant boarding homes are licensed by the Department of Public Welfare. Only about 2,000 of the total of 5,400 of these homes are now actively operating. They are inspected by the Department of Public Welfare and must be under the supervision of physicians. Every child entering a boarding home must be registered. About 3,000 children are at present in these homes. In 1927, in rural areas 11,002 nurses' visits to 5,291 infants or 2.1 visits per infant were reported and in urban areas 184,478 visits. It was not possible to obtain a figure for the number of infants represented by these visits in urban areas, but there were approximately 78,000 births in the urban part of the state in 1927. The number of infants visited in the rural areas would indicate that at least 40 per cent of the

total infant population of the state had been included in the visits. Certificates of birth are issued by the Health Department and literature on child care is sent out with each certificate.

Preschool Hygiene

The infant hygiene program in which the Federal Children's Bureau cooperates is interpreted as including the preschool child. In many cases, children are being examined before they enter school. Some attention is given to mental hygiene in connection with the group. There are two or three mental hygiene clinics in the state, and a good deal is being accomplished by the juvenile research group in the Department of Public Welfare. A bureau in the Public Welfare Department also gives special attention to a program to obtain satisfactory orthopedic treatment for all crippled children. In 1927, in rural districts 14,455 nurses' visits were made to 8,023 preschool children (1.8 visits per child); in the urban districts 27,762 visits were made to 23,974 preschool children (1.1 visits per child). This would indicate that about 5 per cent of the preschool population had nursing visits in 1927.

School Hygiene

There is no division or group in the State Department of Health giving special attention to school hygiene. Most of the school hygiene work is done by the Department of Education and by the Ohio Public Health Association. What is done by the State Department of Health is mostly done by the Division of Hygiene rather than by the Division of Child Hygiene. The Ohio law authorizes the employment by boards of education of school physicians and school nurses, and health examinations, if not made by the board of education, are to be made by the board of health. The medical examination is not compulsory if the parent objects.

In some cities in Ohio the school health work is done by the board of education and in others by the board of health. The State Department of Health has no facilities for correcting defects but in a few cities the board of education has provided such facilities. There is close cooperation between the State Department of Education and the State Department of Health; a textbook on health and physical education is being issued jointly by these Departments.

Bureau of Hospitals

The Bureau of Hospitals, like the Bureau of Tuberculosis Control (see page 86), is a subdivision of the Division of Hygiene. It has to do with the registration and inspection of hospitals. The registration of all hospitals is required by law and the State Department of Health is required to classify them. The Department has defined a hospital, a maternity hospital, and a dispensary. There are 336 general and 11 special hospitals in the state. The responsibility for inspecting these rests on the local county commissioners and boards of health. Certain minimum standards for tuberculosis hospitals have been prepared by the Public Health Council. All tuberculosis hospitals are inspected yearly by the State Department of Health and all hospitals taking maternity cases are licensed and inspected by the same Department. A physician in Ohio is liable for damages if he sends a patient to an unlicensed hospital, so a list of licensed hospitals is supplied to physicians.

Bureau of Public Health Education

This Bureau is a subdivision of the Division of Child Hygiene. Its activities will be discussed in the section on popular health instruction (page 141).

The following table is a summary of data on school health activities in 1927 in the states of Massachusetts, Michigan, and Ohio.

TABLE XXII

DATA ON HEALTH ACTIVITIES IN THE SCHOOLS MASSACHUSETTS, MICHIGAN, AND OHIO, 1927

	MASS.	MICH.	OHIO
Elementary school enrollment:			
Public	595,645	720,151	983,577
Private	140,479	104,696	146,471
High school enrollment:			
Public	133,884	126,706	220,727
Private	16,434	10,807	16,728
Postgraduate enrollment	. . .	526	. . .
Vocational school enrollment	. . .	. . .	25,200
Kindergarten enrollment	6,482	441	36,215
Number of public elementary schools	2,750	8,000	8,959
Number of parochial elementary schools	. . .	110	. . .
Number of public high schools	251	600	1,514
Number of parochial high schools	. . .	40	. . .
Per cent of school children examined once a year by physicians	100.0	75.0	[1]10.0
Parents notified of defects	yes	yes	yes
Reparative work done	([2])	([3])	no
Per cent of pupils weighed yearly or oftener	100.0	100.0	75.0
Frequency of weighing pupils who are ten per cent underweight	monthly	monthly	monthly
Average number of physical examinations per hour	10	12	11

Note: Percentages are estimated. Absence of figures means that there is no record.

[1]The Board of Education recommends three times in school career.

[2]Some dental work only. [3]In a few cities only.

TABLE XXII—Continued

	MASS.	MICH.	OHIO
Examinations of hearing made by	[4]teacher	nurse	nurse or teacher
Examinations of vision made by	[4]teacher	nurse	nurse or teacher
Inspections made in addition to examination	yes	yes	yes
Per cent of children examined showing:			
Defects of teeth	26.0	. . .	50.0
Defects of eyes	25.0	. . .	13.0
Defects of nose and throat	18.0	. . .	25.0
Defects of hearing	. . .	. . .	1.7
Defects of the heart (functional)	10.0	. . .	1.3
Defects of the lungs	. . .	. . .	.7
Malnutrition	12.0	. . .	. . .
Defects of glands	. . .	. . .	12.0
Defects of posture	21.0	. . .	. . .
Per cent of defects corrected	58.0	75.0	40.0
Average number of minutes per week given to health instruction:			
Urban	50	[5]	45
Rural	40	[5]	. . .
Grades included in public health instruction	1–8	1–8	1–8
Per cent of grades above third using health textbook	90.0	90.0	95.0
Per cent of teachers qualified as health instructors	25.0	50.0	33.0
Per cent of schools having systematic instruction in physical education	90.0	75.0	90.0

[4]With the aid of the nurse.

[5]The Department of Public Instruction recommends thirty minutes per day.

TABLE XXII—Concluded

	MASS.	MICH.	OHIO
Average number of minutes per day given to physical education	30	15	20
Per cent of schools having supervision of recess period	95.0	60.0	40.0
Per cent of schools having safe water supply:			
Urban	98.0	95.0	80.0
Rural	(6)	90.0	(6)
Per cent of schools having sanitary toilets:			
Urban	90.0	75.0	70.0
Rural	(6)	50.0	(6)
Per cent of schools having adequate lavatories:			
Urban	90.0	85.0	85.0
Rural	(6)	60.0	(6)

[6]Included with urban.

Public Health Nursing

MASSACHUSETTS

There is no separate division or group in the State Department of Health dealing with public health nursing. The nursing activities are grouped under the Division of Hygiene.

MICHIGAN

In the Michigan State Department of Health, public health nursing is linked up with child hygiene in the Bureau of Child Hygiene and Public Health Nursing.

OHIO

In the Ohio State Department of Health there is a definite Division of Public Health Nursing with a staff consisting of

a chief, two instructional nurses, two orthopedic nurses, one maternity hospital inspector, two tuberculosis nurses, one home builders' league nurse, one nurse for school work, eight nurses for field child hygiene work, and one stenographer, a total of nineteen. Some of these nurses are members of the staffs of other divisions, as the Public Health Nursing Division exists to aid other divisions rather than to engage in activities of its own.

The main activities of the Division are:

Developing public health nursing service.
Maintaining a nurses' directory.
Keeping records.
Furnishing nursing service to other divisions.

County commissioners are authorized by law to employ public health nurses for tuberculosis work, subject to the approval of the State Department of Health. City boards of health and general health districts are also authorized to employ public health nurses. All nurses in the State Department of Health are under civil service. To qualify, they must have a course in public health or a course under some recognized public health agency. The State Department has no legal supervision over public health nurses unless they are doing tuberculosis work. A school nurse must be a trained nurse, that is, a graduate registered nurse. Of the 828 public health nurses now in Ohio, 138 are at work in rural districts and do instructional work only. In cities a few public health nurses do bedside nursing. In 1913 there were only fourteen communities that had public health nursing service; in 1927 there were sixty-nine services in rural areas and 159 in cities. In 1927 a total of 47,961 nursing visits were made in urban and 126,088 in rural districts.

Control of Milk, Food, and Drugs, and Sanitary Inspection

MASSACHUSETTS

In the Massachusetts State Department of Health there is a Division of Food and Drugs with a director and a staff of twenty-three inspectors and office and laboratory assistants.

The main activities of the Division are:

The collection and examination of samples of milk, food, drugs, coal, and liquor.

The enforcement of mattress, bakery, ice cream, factory, cold storage, slaughtering, and other food and drug laws.

The inspection of pasteurization plants.

The Massachusetts Food and Drug Law was passed in 1882, one of the earliest of its kind in the United States, and the Health Department has been most successful in the administration of the law.

The staff of this Division collects and analyzes annually about 9,000 samples of milk, 1,500 samples of other foodstuffs, and 100 samples of drugs, besides examining for police departments some 8,500 samples of liquor and 100 samples of narcotics and poisons. On the average, about 300 persons are prosecuted each year for violation of the Food and Drug Law.

Milk

The sanitary control of the milk supply is directly under local boards of health in cities and towns. Because these municipalities can set up their own bacteriological and sanitary standards, little bacteriological work is done by the Division. However, the State Department of Health has

made regulations regarding the bacteriological content of milk after pasteurization and as a result bacteriological examinations are now being made by the Division. There are no state laws regarding the tuberculin testing of cattle, although about 18 per cent of the dairy cows have been tested. There is no state requirement that milk shall be pasteurized, but there is prohibition of repasteurization. Pasteurization is defined as heating to 140° to 145° F., and holding at that temperature for one half-hour. Since 1927 pasteurizing plants have had to be licensed.

Other Foods

Every city and town must have an inspector of slaughtering who must be approved by the State Department of Health. All cold storage houses are licensed by the Department and are inspected by it. Bakeries are inspected annually and reports of findings on them and on ice cream factories are sent by the Division to the local boards of health. The state inspectors aid local inspectors and frequently give them instruction.

MICHIGAN

In Michigan, food and drug supervision is not under the State Department of Health. Foods are under the control of the Department of Agriculture and drugs are under a state Board of Pharmacy.

Milk

Milk, like other foodstuffs, is under the control of the Department of Agriculture. There are no state requirements in regard to tuberculin testing of dairy cattle, although 79.6 per cent of them have been tested. There is no state law requiring pasteurization of milk, although there is one gov-

erning the pasteurization of by-products of milk, that is, such by-products as are used for stock-feeding.

Food-handling Establishments

The inspection of these places comes under the Department of Agriculture and is done about twice a year. It is only when a nuisance or a case of communicable disease is reported that the Department of Health makes an investigation. In 1927 the State Department of Health made 979 sanitary inspections, 305 of them in regard to water supplies and 275 in reference to excreta disposal. Hotel inspection is under a Joint Board of the Departments of Health, of Labor, of Insurance, and of Agriculture. The average number of inspections is two per establishment per year. Restaurants, lunch stands, canneries, etc., are inspected by the Department of Agriculture once or twice a month. Camp sites are inspected by the Conservation Board and the Department of Health. Water supplies for common carriers (interstate traffic) are inspected by the Bureau of Engineering of the State Department of Health, which made 243 inspections in this connection in 1927.

Inspections regarding mosquito breeding places, stream pollution, and swimming pools are made by the same Bureau. In 1927, ninety-one investigations were made regarding stream pollution and sixty-five inspections of swimming pools. There is no state law requiring an examination of food-handlers, but the State Department of Health's rules prohibit persons having a communicable disease from handling foodstuffs for the public.

OHIO

In Ohio, food (including milk) and drug control is under the Department of Agriculture. That Department has

TABLE XXIII

CONTROL OF MILK, MASSACHUSETTS, MICHIGAN, AND OHIO, 1927

	MASS.	MICH.	OHIO
Consumption of milk per capita, in pints	.9	.9	1.0
Approximate number of cows in state	190,000	1,000,000	917,000
Approximate number of milk cows in state	150,000	849,000	752,000
Per cent of dairy cows tuberculin tested	18.0	80.0	75.0
Number of dairy farms	33,000	[1]211,000	110,000
Number of dairy farm inspections per year	1	(2)	1
Number of pasteurizing plants	450	64	440
Number of inspections of pasteurizing plants per year	1	3	1
Per cent of milk supply pasteurized	68.0	77.0	83.0
Per cent of pasteurizing plants inspected	100.0	100.0	100.0
Per cent of total milk supplies having samples taken for analysis	85.0	85.0	90.0
Per cent of total milk supply having samples taken before pasteurization	40.0	25.0	10.0
Per cent of such samples showing bacterial counts less than 500,000 per c. c.	25.0	50.0	60.0
Per cent of pasteurized milk showing bacterial counts less than 50,000 per c. c.	75.0	75.0	75.0
Per cent of milk sold as raw having counts less than 50,000 per c. c.	10.0	30.0	18.0
Per cent of pasteurizing plants having recording thermometers	100.0	60.0	73.0

Note: Percentages are approximate. [1]Farms, not all dairy farms. [2]No record.

prepared a set of sanitary regulations governing the handling of foodstuffs.

Milk

Regulations have been drawn up for dairies, but there is no state law requiring pasteurization of milk. A state law provides for the carrying out of the tuberculin testing of cattle. Testing is optional with the owner, but once he has started the test he must complete it, if 75 per cent of the cattle in the district have been tested. Once 90 per cent of the cattle in the county have been tested, authorized veterinarians may independently of the owners test the other 10 per cent.

Foodstuffs other than Milk

The sanitary inspection service is under local health departments, the Department of Agriculture, and the State Fire Marshal. The sanitary inspection and the licensing of hotels, restaurants, lunch stands, and soda fountains attached to restaurants are under the jurisdiction of the Fire Marshal. In 1927, 2,554 hotels and 10,892 restaurants, lunch counters, etc., were licensed. Inspection is made at least yearly by the Fire Marshal's staff of thirty-three inspectors; a total of 33,570 inspections were made in 1927.

Inspection of fruit stands, soda fountains (without restaurants), stores, bakeries, etc., is made by the Department of Agriculture, which has a staff of twenty-five inspectors. The Director of Health may require an examination of food-handlers in bakeries, construction camps, and dining cars, and the Department of Health rules forbid any one with a communicable disease to work in a restaurant or to handle food for the public. It is estimated that nearly 50 per cent of the regular food-handlers in the state have had a physical examination.

Popular Health Instruction

MASSACHUSETTS

Public health education is a subdivision of the Division of Hygiene in the Massachusetts State Department of Health. The director of that Division is in charge of this activity and has the assistance of health education workers, most of whom divide their time with other activities.

Pictorial material is prepared, delineascope films and motion picture films are made available, and literature on many public health activities is furnished the public, some half-million copies having been distributed in 1927. The supply of pamphlets and leaflets does not cover all communicable diseases for which leaflets are usually prepared. Newspaper publicity is arranged for through 200 newspapers and a quarterly bulletin called *The Commonhealth*, with a circulation of 5,000, is prepared and published. A lecture service is available and conferences on health matters are held for all health workers in connection with the Massachusetts Associated Boards of Health. Quarterly local conferences for health officers and other health workers are also held, and much educational work is done by the staff of this Division and of other divisions in connection with medical schools, schools of public health nursing, and other institutions. An attempt is made by the Division to make all local child health committees a means of disseminating information, and there are now 145 of these in the state. A public health library is maintained by the Health Department for its staff and other health workers.

MICHIGAN

In the Michigan State Department of Health there is a Bureau of Public Health Education which was established

in 1920. The staff of the Bureau consists of a director, an assistant in charge of visual education, two field workers, and two office assistants, a total staff of six.

The activities of this Bureau are:

Furnishing lecture service to local organizations.
Giving help in organizing local campaigns.
Preparing and distributing literature.
Editing the Department's monthly bulletin, *Michigan Public Health.*
Furnishing material on public health for a page in the *Michigan State Medical Journal* and in the *Michigan Municipal Review.*
Arranging for the annual conference of the Michigan Public Health Association.
Preparing posters, leaflets, and other publicity material.
Holding exhibits.
Lending picture films.
Maintaining a public health library of 3,000 volumes available for public health workers in the state.

The Bureau has two full-time lecturers, one a physician and the other an ex-teacher, constantly going about the state addressing meetings. The Commissioner, the Deputy Commissioner, and the directors of bureaus are also frequently in the field addressing conventions and assemblies.

The Bureau prepares a news letter that goes out in the name of the Michigan Public Health Association and has a circulation of 9,600. From July, 1927, to March, 1928, over 9,000 requests for information or literature had come to the Bureau from teachers, public health workers, and others. The Bureau keeps on hand literature on all ordinary communicable diseases and on a wide range of subjects that have to do with public health. The Bureau is cooperating in giving health instruction to all teachers at the four state normal schools and is now arranging to give similar service to the forty-five county normal schools.

OHIO

In the Ohio State Department of Health there is a Bureau of Public Health Education which is one of the subdivisions of the Division of Child Hygiene. This Bureau is distinct from the Bureau of Publicity which is part of the Division of Administration. The latter Bureau has to do with publicity through newspapers, the publication of the *Ohio Health News* (5,000 circulation), and other publicity work (see page 31), while the former has to do with instructional services through the office but more especially in the field by lectures and demonstrations. The Bureau has two lecturers, one a physician and the other a well-qualified woman speaker, who are almost constantly addressing meetings in different parts of the state. In one year the woman lecturer alone gave 557 talks to 86,742 persons. Exhibits are put on at county fairs, two automobiles being equipped and used for health shows, and there are two motion picture operators and a library of films in the Department. The Department of Health maintains a public health library of about 4,000 volumes for the use of health workers.

The Department of Health has literature available for distribution on nearly all public health activities and on all common communicable diseases. Much educational work is done through the Darke County training base for health officers and nurses, and through the annual and quarterly district conferences of the Ohio Society of Sanitarians.

In 1927, the Department of Health distributed 88,000 pieces of literature on venereal disease and social hygiene, 100,000 pieces on communicable disease, and 37,000 on other public health subjects.

Industrial Hygiene

MASSACHUSETTS

There is no division or bureau in the Massachusetts State Department of Health that has to do with industrial hygiene. This activity is part of the function of the State Department of Labor and Industries. The State Department of Health, however, does retain a specialist as an industrial medical consultant to give advice on all questions of industrial hygiene that concern the Department. Massachusetts was the first of the states to collect (in 1904) scientific data on occupational disease, and at that time the State Board of Health made investigations into the sanitary condition of workshops and factories. The Department of Labor and Industries has drawn up rules for the prevention of accidents and of industrial or occupational disease. Rules governing the sanitation of work places have also been prepared, and regulations control the employment of women and children in industry.

The Department of Labor and Industries has a staff of forty inspectors who are constantly making inspections of places of employment and giving advice to the operators. The state requires that all occupational diseases shall be reported. In 1926 the Department of Labor and Industries made 47,649 inspections and 12,086 reinspections.

MICHIGAN

There is as yet no bureau of industrial hygiene in the Michigan State Department of Health, but a field lecturer (a physician) gives about half his time to visiting industrial plants and to the preparation of a survey of health conditions in these plants with a view to having some definite provision made in the Department for industrial hygiene.

There is no other state department in Michigan in charge of industrial hygiene, except in so far as the Department of Labor and Industry has to do with employment in industry, industrial accidents, and workmen's compensation. There is a state law governing the employment of women and children in industry.

OHIO

The Ohio State Department of Health has as one of its divisions, the Division of Industrial Hygiene with a staff consisting of a chief, a consultant physician, and a stenographer.

The main functions of the Division are:

The investigation of industrial diseases and poisoning.

The study of factory ventilation and consultations with factory medical staffs.

The administration of the law requiring the reporting of occupational diseases.

In Ohio there is a State Department of Industrial Relations that gives attention to the inspection of industrial plants, while the State Department of Health confines itself to a study of occupational diseases and hazards connected with industry. Practically all employees and employers in Ohio come under the Workmen's Compensation Act. All reports of occupational diseases (and reporting them is required by law) are sent both to the State Department of Industrial Relations and to the State Department of Health. Occupational diseases are reported at the rate of about one hundred cases a month. Of the 8,300 physicians in the state, 1,080 have reported cases of occupational disease, and of the 30,000 industrial plants, 1,100 have reported cases.

The Industrial Hygiene Division does considerable educational work, but most literature is distributed by the Division of Safety and Hygiene of the Department of Industrial Relations. Ohio has set forth in its General Code definite

TABLE XXIV

COMPENSABLE CASES REPORTED, OHIO, 1927

	NUMBER OF CASES
Dermatitis	778
Lead poisoning	176
Benzol poisoning	10
Zinc and brass poisoning	3
Anilin poisoning	2
Mine gas poisoning	2
Mercury poisoning	1
Compressed air illness	1

laws regarding the employment of women and children in industry and definite sanitary regulations that are to be observed in plants and factories. Factory inspection is done by the Department of Industrial Relations, which has a Bureau of Inspection consisting of twenty-five men and nine women inspectors. These inspectors are vested with police power and may issue abatement or correctional orders. The Industrial Hygiene Division of the Department of Health does a large amount of research work, some of it in conjunction with the State University, where the consultant physician of the Division is professor of industrial hygiene.

Mental Hygiene

MASSACHUSETTS

In Massachusetts the work of mental hygiene is a function of the Department of Mental Diseases, in which Department there is a Division of Mental Hygiene. Assistance is given the State Department of Mental Diseases by a voluntary organization, the Massachusetts Society of Mental Hygiene. The Division of Mental Hygiene is entrusted with powers and duties "relating to the cause and prevention of mental disease." The preventive program begins with a mental

examination of all school children. The Division also has the responsibility of examining prisoners guilty of felony and of capital offenses. Its main duties are:

The care and supervision of all insane, feeble-minded, and epileptics (approximately 23,000 persons).
The supervision of fifteen public institutions.
The supervision of about twenty-five private institutions.
The conducting of clinics at hospitals and institutions.

About eight million dollars is appropriated annually for the fifteen public institutions. The average cost per week per patient in these institutions in 1927 was $6.88.

A law in Massachusetts requires that all school children retarded three years in school work must be placed in special classes. The object of the law is to discover retarded children and to provide training suited to their individual needs. Annually, about 5,000 retarded children are discovered and already over 6,000 have been placed in special classes, in 118 towns in the state. Eight mental clinics (four in Boston) for preschool children are being conducted. In 1927, these clinics were attended by 471 children.

MICHIGAN

There is no bureau in the State Department of Health or in any other state department having to do with mental hygiene. There is no state law in regard to the subject, except a law providing for the sterilization of the mentally defective (idiots, imbeciles, and feeble-minded but not the insane).

The Bureau of Institutional Health Administration in the Department of Health, which was abolished in July, 1927, had the services of a psychiatrist, but since that date practically all that has been done in mental hygiene has been for the preschool group by the Bureau of Child Hygiene.

OHIO

Ohio is also without a division or bureau of mental hygiene, and about the only work done along mental hygiene lines is done by the Bureau of Juvenile Research in connection with the State Department of Public Welfare. There is no state legislation in regard to mental hygiene. The Bureau of Juvenile Research has a building near the State Mental Hospital with accommodation for 150 children. Most of the children admitted are referred by the juvenile court, although some are sent by parents without court procedure, and some are brought for diagnosis. The Bureau has established a "flying clinic" (consisting of four psychologists) that goes about the state giving advice and making diagnoses of mental cases in children. It also examines all girls admitted to the Girls' Industrial School, and all women admitted to the Women's Reformatory. At the Juvenile Research Home in Columbus about eighty children are admitted per month, the average stay in the institution being less than one month. Very satisfactory results have attended the Juvenile Research Bureau's work.

Other Activities

MASSACHUSETTS

There is no division or group in the Department devoting special attention to heart disease as a public health problem. In Boston there is an active branch of the American Heart Association which has been able to establish heart clinics at the Massachusetts General Hospital (400 attendance), the Children's Hospital (400 attendance), the City Hospital, and at the Peter Brent Brigham Hospital. A recent study of the school children in Boston showed that there were about 800 cases of organic heart disease in pupils between six and fifteen

years of age, 432 of whom now attend the Children's Hospital cardiac clinic and the Massachusetts General Hospital cardiac clinic. Of 615 cases requiring and getting special care, all but thirty had so improved that they were no longer confined to bed. The average stay in hospitals was 100 days.

The State Department of Health is required to license all dispensaries, as, in addition to the tuberculosis dispensaries, by law "towns may establish and maintain dental, medical, and health clinics" and dispensaries. There are seventy-five local dispensaries (exclusive of tuberculosis) operating in the state, and no dispensary is licensed unless its establishment is "for the public benefit." A fee of five dollars is charged for the license except where the dispensary belongs to a charitable organization. Certain requirements must be met by a dispensary before it can be licensed: it must have a licensed physician in charge, a registered nurse, proper room space and equipment, and it must keep a record of every case treated.

The relation of the Department of Health to hospitals has been commented upon in the section dealing with the Division of Tuberculosis Control, and its relation to the Subdivision of Cancer, in the section dealing with the Division of Administration.

MICHIGAN

In the Michigan Department of Health there are two bureaus in addition to those already mentioned, namely, the Bureau of Licensing Embalmers and the Bureau of Mouth Hygiene and Preventive Dentistry. The Bureau of Licensing Embalmers has a director and a part-time stenographer. It conducts embalmers' examinations, issues licenses, issues subregistrar certificates, registers embalmers' apprentices, issues permits for disinterment, and enforces burial laws.

The Bureau of Mouth Hygiene consists of a director (a dentist) and a part-time stenographer. The Bureau furnishes consultation service in school and general public health dental programs, prepares educational material, and furnishes a lecture service on dental hygiene.

Surveys made since the Bureau was established at the beginning of 1926 indicate that 86 per cent of the second grade (seven-year-old) school children need tooth extractions, 55 per cent have cavities in their permanent teeth, and 56 per cent show definite signs of mouth infection.

There are no bureaus in the State Department of Health dealing particularly with a program of cancer or heart disease control, although information and advice on these matters are given by the Department in connection with the general program of public health education. No bureau in the Department of Health has especially to do with hospitals. No hospitals are managed by the Department of Health; but tuberculosis hospitals must be inspected and all sites for new hospitals must be approved by the Department.

OHIO

There is no division or group in the Ohio State Department of Health giving special attention to cancer or heart disease, and no special program for their control has been adopted. In publicity campaigns, use is made of the leaflets of the American Society for the Control of Cancer, and data on cancer in the state is prepared. In educational campaigns, prominence has been given to the heavy toll of life taken by heart disease, and in Cleveland and Cincinnati local heart clinics have been established.

The General Assembly in Ohio appropriated in 1929 the sum of $10,000 to the State Department of Health for educational work in mouth hygiene.

CHAPTER IV

PUBLIC HEALTH APPROPRIATIONS AND EXPENDITURES

MASSACHUSETTS

IN 1915 the total appropriation by the State Legislature for the State Department of Health, inclusive of tuberculosis work, was $892,996 and $211,700 exclusive of it; in 1927 the appropriation was $2,240,673 inclusive of tuberculosis work and $592,945 exclusive of it. The amount exclusive of tuberculosis is given separately because of the comparatively large sums (70 per cent of the total) allocated to tuberculosis, which in Massachusetts includes tuberculosis hospitalization. The state makes its appropriations for the work of the different divisions in the Department under (1) salaries and (2) expenses.

MICHIGAN

The appropriations made by the Legislature for the State Department of Health are not made by bureaus or for individual salaries except that of the Commissioner. An allotment is made in one lump sum, divided into:

Personal services (salaries).
Supplies and contractual service (including travel, gas, light, heat, etc.).
Equipment.
Hospitalization, clinics, and treatment (salvarsan, etc.).

In 1915 the total appropriation for the Department was $32,000; in 1927, it was $496,827.95, $34,741.11 of this being from federal funds (see Table XXVI).

OHIO

The legislative budget for the State Department of Health has increased greatly since 1919. The major part of the increase has been due to increased state subsidies for local health departments, which are paid on certification from the State Department of Health, and are shown in the Department's budget. In 1915, the legislative budget for the Department was $120,810 and in 1927 it had become $565,862.10 (see Table XXVII).

Per Capita Appropriations

The Massachusetts Legislature appropriated $2,240,673 to the State Department of Health for its activities in 1927. Of the total appropriation, only $647,947, or fifteen cents per capita, was spent for activities of the different divisions in the Department, if all financial aid to institutions is excluded. The total appropriation for 1928 ($2,385,670) represents about fifty-five cents per capita, or sixteen cents per capita if all sums for subsidies and for institutions are excluded.

In Michigan $496,827.95 (which included $34,741.11 from federal funds) was appropriated in 1927 for the State Department of Health, so that the net sum from the state was $462,086.84, or ten and one-half cents per capita. Of the total appropriation, $474,816.37 was spent for the regular work of the Department, not including subsidies or sums for support of institutions.

In Ohio $565,862.10 was appropriated in 1927 by the Legislature for the State Health Department. The sum of $32,500 was received from federal funds and small sums from other sources, so that the total budget was increased to $598,362.10. Of the total appropriation by the Legislature, $256,359.16 was for subsidies to local health departments.

The State Health Department expended for its own activities from the state appropriation $309,502.94; that is, the state appropriated about nine cents per capita for public health work, but of that amount about four cents was for subsidies to local health departments.

In a tabulation made by the writer of the appropriations for 1926 made to State Health Departments by the state legislatures in the forty-eight states, it was found that the average per capita appropriation was ten and one-half cents, the exact amount appropriated by Michigan in 1927. Massachusetts exceeds the average considerably, while Ohio falls below it. In the tabulation of all the forty-eight states for 1926, Massachusetts stood sixth from the top of the list, Michigan fourteenth, and Ohio fifteenth in the per capita appropriations for public health through the State Department of Health. Hence of the three states being considered one is in the upper quartile and the other two well up in the second highest quartile when states are arranged in median order in regard to per capita appropriations.

TABLE XXV

TOTAL APPROPRIATION AND EXPENDITURES BY DIVISIONS, STATE DEPARTMENT OF HEALTH
MASSACHUSETTS, 1915-1927

	1915	1916	1917	1918	1919	1920	1921
Total appropriation . . .	$ 892,996	$1,079,121	$1,079,461	$1,362,381	$1,381,356	$1,556,314	$1,525,478
Total appropriation exclusive of tuberculosis sanatorium funds . . .	211,700	232,670	262,050	322,352	376,302	499,582	387,591
Expenditures:							
Central Administration	36,274	23,574	22,594	26,922	25,219	30,725	26,919
Water and Sewage Laboratory	28,046	25,364	26,949	26,441	29,032	31,595	34,461
Biological Laboratory .	25,640	28,921	33,577	40,284	48,939	57,697	68,008
Sanitary Engineering .	27,998	31,258	27,120	27,962	35,367	38,311	39,817
Food and Drugs . . .	32,442	33,558	36,822	37,496	46,540	55,682	61,204
Communicable Disease Control	46,874	51,922	59,164	60,299	83,869	77,295	77,543
Venereal Disease Control	. . . .	. . . .	. . . .	21,959	33,569	35,835	30,547
Hygiene	. . . .	14,263	20,000	23,410	27,484	37,480	41,801
Tuberculosis Control .	. . . .	. . . .	. . . .	. . . .	. . . .	14,354	16,296

TABLE XXV—Continued

	1922	1923	1924	1925	1926	1927
Total appropriation	$1,561,651	$1,607,642	$1,614,049	$1,847,690	$2,091,450	$2,240,673
Total appropriation exclusive of tuberculosis sanatorium funds	481,621	504,504	516,314	520,017	[1]513,365	[1]592,945
Expenditures:						
Central Administration . .	27,973	27,520	28,591	25,700	29,849	35,844
Water and Sewage Laboratory	35,626	37,026	38,607	40,170	41,063	43,008
Biological Laboratory . . .	74,948	81,526	92,313	94,204	92,693	131,779
Sanitary Engineering . . .	58,618	58,981	56,664	74,949	73,701	84,253
Food and Drugs	62,080	63,884	76,918	70,006	62,463	64,108
Communicable Disease Control	76,598	77,302	70,318	65,918	64,213	70,029
Venereal Disease Control .	29,396	34,509	37,691	30,562	27,631	24,214
Hygiene	58,136	89,556	79,406	81,493	80,065	70,428
Tuberculosis Control . . .	17,993	18,507	39,900	[2]91,938	[2]98,206	[2]91,956
Cancer Clinics	. . . .	. . . .	. . . .	. . . .	9,762	32,355

[1] Cancer hospital also excluded.
[2] Clinics included.

TABLE XXVI

TOTAL APPROPRIATION AND EXPENDITURES BY BUREAUS, STATE DEPARTMENT OF HEALTH MICHIGAN, 1915-1927

	1915	1916	1917	1918	1919	1920	1921
Total appropriation	$32,000.00	$82,000.00	$82,000.00	$38,500.00	$38,500.00	$236,433.00	$291,603.00
Expenditures:							
Administrative office	26,081.64	....	....	27,000.00	25,534.37	217,959.00	294,114.00
Epidemiology	....	....	....	....	....	....	....
Records and Statistics	....	....	....	....	....	....	....
Laboratories	5,000.00	....	....	7,500.00	15,686.27	....	....
Engineering	....	....	....	....	....	....	....
Child Hygiene and Public Health Nursing	....	....	....	....	....	....	....
Licensing Embalmers	[1]1,135.65	....	....	[1]1,090.50	[1]328.60	....	....
Institutional Health Administration	....	....	....	....	....	....	....
Public Health Education	....	....	....	....	....	....	....
Antitoxin operation	....	....	....	....	....	....	....

[1]Paid from fees.

TABLE XXVI—Continued

	1922	1923	1924	1925	1926	1927
Total appropriation . . .	$327,603.00	$382,075.00	$444,059.00	$454,579.00	[1]$459,766.11	[2]$496,827.95
Expenditures:						
Administrative office . .	325,687.00	42,558.19	46,224.66	49,779.83	37,662.69	52,841.61
Epidemiology	. . . .	21,395.87	15,322.09	23,577.24	24,571.16	21,546.20
Records and Statistics. .	. . . .	24,259.59	20,899.79	29,919.11	31,508.06	31,390.54
Laboratories	. . . .	80,693.22	104,936.04	100,356.20	114,903.85	134,295.68
Engineering	. . . .	[3]27,690.15	29,968.89	25,702.50	26,920.20	31,577.92
Child Hygiene and Public Health Nursing	. . . .	49,204.40	55,030.31	71,914.30	67,573.23	68,658.90
Licensing Embalmers . .	20,676.00	2,639.56	2,441.52	2,423.42	2,608.05	3,156.35
Institutional Health Administration	. . . .	25,503.43	30,734.60	35,455.13	41,248.16	43,924.03
Public Health Education	. . . .	18,192.74	23,158.99	21,788.68	23,961.18	22,765.75
Antitoxin operation . . .	. . . .	41,011.32	37,339.63	56,476.28	48,956.09	64,659.39

[1]Includes $34,741.11 federal appropriation.
[2]Includes $34,741.11 federal appropriation and $40,061.84 special State appropriation for antitoxin operation.
[3]Paid from emergency fund.

TABLE XXVII

TOTAL APPROPRIATION AND EXPENDITURES BY DIVISIONS, STATE DEPARTMENT OF HEALTH, OHIO, 1915-1927

	1915	1916	1917	[1]1918	[1]1919	[1]1920	[1]1921
State Legislative appropriation	$120,810	$128,077	$128,005	$128,005	$198,140	$401,233	$396;610
Total budget available	126,850	129,508	128,233	179,837	214,307	456,043	420,345
Expenditures:							
Vital Statistics	27,871	17,413	26,269	28,256	28,653	30,404	33,410
Child Hygiene	....	....	....	....	....	....	....
Administration	....	....	....	....	....	....	....
Communicable Disease Control	....	....	....	....	....	....	....
Venereal Disease Control	....	....	....	....	51,832	66,750	55,280
Hygiene	....	....	....	....	....	....	....
Tuberculosis Control	....	....	....	....	....	....	....
Laboratory	....	....	....	....	....	....	....
Sanitary Engineering	....	....	....	....	....	....	....
Public Health Nursing	....	....	....	....	....	....	....
Industrial Hygiene	....	....	....	....	....	....	....
Subsidy paid local health departments	....	....	....	....	....	[2]75,000	[2]225,000

[1]Includes United States Public Health Service funds. [2]Includes local funds.

TABLE XXVII—Continued

	[1]1922	[1]1923	[1]1924	1925	1926	1927
State Legislative appropriation	$412,058.00	$530,100.00	$575,317.00	$573,713.00	$549,688.30	$565,862.10
Total budget available	443,295.00	555,671.00	599,393.00	600,961.00	581,443.03	598,362.10
Expenditures:						
Vital Statistics	32,640.00	34,529.00	39,546.00	39,620.00	36,641.55	37,477.38
Child Hygiene	....	20,408.00	43,344.00	80,327.00	[3]54,769.78	[3]64,808.00
Administration	....	....	41,223.00	40,310.00	47,048.50	45,464.81
Communicable Disease Control	....	....	29,924.00	36,513.00	[4]31,871.52	[4]37,461.13
Venereal Disease Control	32,307.00	27,827.00	22,740.00	22,408.00	....	....
Hygiene	....	....	10,900.00	19,967.00	[5]19,399.10	[5]12,993.00
Tuberculosis Control	7,998.00	[2]11,350.00	[2]8,899.00	[2]10,540.00	....	....
Laboratory	....	....	50,444.00	40,946.00	58,814.38	63,564.87
Sanitary Engineering	....	....	43,344.00	80,327.00	57,670.95	54,253.04
Public Health Nursing	....	....	11,500.00	15,238.00	16,971.02	19,948.71
Industrial Hygiene	....	....	5,680.00	6,563.00	6,563.19	6,032.00
Subsidy paid local health departments	[6]225,000.00	[6]225,000.00	[6]224,797.64	[6]250,000.00	[7]251,793.04	[7]256,359.16

[1]Includes United States Public Health Service funds.
[2]Includes Children's Bureau funds.
[3]Includes $32,500 federal appropriation.
[4]Includes venereal disease.
[5]Includes tuberculosis, about $7,000 for 1926 and 1927.
[6]Includes local funds.
[7]Does not include $5,200 International Health Board appropriation.

TABLE XXVIII

BUDGETS OF THE DEPARTMENTS OF HEALTH BY DIVISIONS OR BUREAUS, PERSONNEL, AND SALARIES MASSACHUSETTS, MICHIGAN, AND OHIO, 1927

DIVISION OR BUREAU	BUDGET			NO. OF PERSONNEL			SALARY OF CHIEF			SALARIES OF OTHER PERSONNEL			TOTAL EXPENDITURES AND SALARIES		
	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO	MASS.	MICH.	OHIO
Administration . . .	$37,400	$52,841	$45,465	14	7	11	$7,500	$10,000	$6,500	$16,380	$13,771	$18,790	$33,622	$52,841	$45,465
Communicable Disease or Epidemiology . .	71,250	21,546	37,461	25	10	11	5,100	7,500	4,000	49,840	9,657	21,900	69,220	21,546	37,461
Tuberculosis[1]	95,620	..	..	33	..	..	6,000	..	..	67,020	..	..	99,018	..	..
Venereal Disease[2] . .	28,820	..	..	5	..	..	([3])	..	..	7,380	..	..	24,546	..	..
Vital Statistics. . . .	..	31,390	41,235	..	19	27	..	5,000	4,000	..	21,345	28,804	..	31,390	41,235
Sanitary Engineering	76,700	31,578	54,253	24	8	22	6,500	5,000	5,000	47,250	19,067	39,520	69,568	31,578	54,253
Laboratories:															
Biological	132,255	134,295	63,565	48	70	35	5,700	6,000	4,000	63,615	76,963	47,760	138,341	134,295	63,565
Water & Sewage[4] .	43,700	..	..	17	..	..	4,800	..	..	29,970	..		42,610	..	
Hygiene	72,960	..	12,993	26	..	6	5,100	..	4,000	40,400	..	6,900	70,382	..	12,993
Public Health Nursing[5]	..	68,659	19,949	..	17	7	..	3,000	..	..	32,640	12,100	..	68,659	19,949
Child Hygiene[6] . . .	..	..	64,808	..	..	18	..	4,000	3,600	..	..	32,360	..	..	64,808
Food & Drugs	69,860	..	..	31	..	..	4,800	..	..	45,360	..	..	66,966	..	..
Industrial Hygiene .	..	..	6,032	..	..	3	..	..	3,000	..	..	2,680	..	..	6,032
Cancer Clinics	45,000	..	..	8	..	..	([7])	..	..	15,780	..	..	33,251	..	..
Mouth Hygiene . . .	..	4,928	..	..	1½	..	..	3,500	..	..	..	..	..	4,928	..
Public Health Education	..	22,766	..	..	6	..	..	3,500	..	..	10,564	..	..	22,766	..
Licensing Embalmers .	..	3,158	..	..	1½	..	..	2,200	..	..	..	..	..	3,158	..

[1]Included with Epidemiology in Michigan, and with Hygiene in Ohio.
[2]Included with Communicable Disease in Michigan and Ohio.
[3]Included with Communicable Disease.
[4]Included with Biological Laboratories in Michigan and Ohio.
[5]Included with Hygiene in Massachusetts.
[6]Included with Public Health Nursing in Michigan.
[7]Included with Administration.

CHAPTER V

COMMENTS ON THE STATISTICAL DATA AND DESCRIPTIVE MATERIAL PRESENTED

THE form of organization, the functions, some of the accomplishments, and the legal authority under which the State Departments of Health of Massachusetts, Michigan, and Ohio operate have been briefly set forth in the preceding pages. It is easy to ask whether any changes, adjustments, or readjustments in the organizations might result in greater effectiveness, but an attempt to answer such a question can be made only after reviewing the local problems confronting the Departments, the facilities provided for solving the problems, and the authority vested in the Departments.

It might be possible to outline what some students of public health regard as an ideal form of state public health organization, but it has to be remembered that the health organization has to fit into the general structure of the political organization of the state as a whole, and that according to modern ideas what Plato endeavored to outline as his ideal state has nowhere yet been completely realized. The actual organization of the state must be taken into consideration, and the form of health department adopted, while perhaps anticipating changes, must fit into the existing structure of the state. Again, it might be possible to adopt an eclectic method and select from different state departments of health what might be thought to be the best individual organization for each particular line of health activity. This method sometimes gives an ideal aggregation but not

always a well-articulated system. States and state health departments have individuality, and usually are what they are as the result of a process of development. Improvements, reconstructions, additions, subtractions, and readjustments are generally possible and often desirable, but all such changes in a state health department must be in keeping with the general structure and organization of the state as a whole. An ideal form of organization might be suggested for any individual state, but states differ so in their problems, facilities, and past accomplishments that no one form is suited to all. A few very general comparisons and suggestions, however, in regard to the State Departments of Health in the three states under consideration may be permitted.

It was pointed out in the introduction that this digest was intended to be not so much an appraisal of health accomplishments as a brief statement outlining the form of organization, the functions, the programs undertaken, and the accomplishments of the different departments. States which differ considerably in area, in the occupations of the people, in the progress already made in public health work, and in the powers and authority entrusted to the state health department can be compared only in a very general way as to their accomplishments, and yet there are many lines of activity that can reasonably be compared, as, for example, the reporting of cases of communicable disease or the number of children immunized in the campaigns against diphtheria. Comparisons of accomplishments are instructive, but local obstacles and prejudices to be contended against cannot be ignored, so that while it is the task of a state health department to create public opinion favorable to its projects, the inherent local difficulties confronting it have to be reckoned with. The state department of health is one of the most

important agencies in getting public health work done, but it is not the only factor. Many public health projects can be more easily carried out in densely populated areas than in sparsely settled rural districts, while the latter are not likely to present some special problems encountered in the former.

General Provision made by the States for the Safeguarding of the Public Health

All three states considered in this report have made provision for a State Board of Health or a Public Health Council and have enacted a number of laws to protect the public health, most of which laws have reference to the protection of public water supplies and the control of communicable disease. They have also provided State Departments of Health, at the head of which are Commissioners or Directors of Health with executive powers to act within certain prescribed limits to prevent the spread of disease and to protect the public health. In Michigan and Ohio wide powers are entrusted to the State Health Commissioners and to the State Departments of Health in regard to the drawing up and enforcing of regulations to protect the public health. In Massachusetts, on the other hand, with the exception of the protection of water supplies, only limited authority has been given the Commissioner or the Public Health Council, most authority in health matters being vested in the local boards of health, which in that state are many in number because of the small areas constituting political administrative units. Whether clothed with authority or not, the general practice in all these three states is for the State Department of Health to regard its function as promotional and advisory rather than as coercive or dictatory.

In Michigan and Ohio, as contrasted with Massachusetts,

the State Departments of Health may, and do, make regulations that have the force of law and are applicable to the whole state, but outside of the resulting uniformity in practice in the case of the first named states, there is very little difference in either the regulations or the method of enforcement of them in the three states. The fact that public health rules and regulations (which are now generally "reasonable" and not mere arbitrary judgments of a few individuals) are applicable to the whole state has certain very definite advantages. It results in uniformity of practice and gives assurance not only that existing rules will be prepared by persons of experience in public health, but that they will be the minimum requirements, because they have to be made applicable to all parts of the state. A local community should always have the right to exceed in stringency those minimum requirements, when such action is purely local and is taken in the interest of what is of special concern to the health of the people in the local unit. Massachusetts' lack of uniformity in public health regulations is compensated for to a considerable degree by the supervisory power given to the district health officers, which tends to produce a uniformity of practice in controlling communicable disease and in other matters, even though the letter of the local regulations may not be the same in all cases.

The existence of a body of advisers, whether called a board of health or a public health council or by any other name, is a guarantee that the commissioner and the department will have advice on questions of policy, and helps to prevent the department from becoming provincial or narrow in its views through providing contact with many different state interests. The Advisory Boards in all three states must give assent to or concur in the state public health regulations. This means that the Boards are something more than

advisory in the matter of adopting and promulgating regulations. It is desirable that health regulations should represent the combined judgment of a number of persons familiar with public health rather than the opinion of one person, no matter how proficient; besides, regulations so originating give additional backing to the Commissioner. In Massachusetts and Ohio the drawing up of the regulations rests with the Board; in Michigan it rests with the Commissioner, but the Board must concur. The former method is the better in theory, but in practice the two methods are almost identical.

All three states have provided offices, equipment, and personnel for the State Department of Health. At the present time, Michigan has the most commodious and best equipped offices, the Massachusetts Department is somewhat cramped through lack of space, and the Ohio Department has the disadvantage of being housed in a place where it can have little intimate contact with other state departments.

Organization of the Health Departments

It will be seen from the digest that all three State Departments of Health are well organized and that their activities have been determined by the health problems confronting them. There has been a widening of scope in the activities of state health departments since Dr. C. V. Chapin made his survey of them in 1914, when venereal disease control had not so impressed the public that it was given a place as one of the major activities. At that date, too, child hygiene work was only beginning to find a place in the program of a state health department, and many departments had not yet fully discarded the idea that their chief function was to enforce quarantine or to take action in the presence of developed or threatened epidemics. The possibilities of preventive pro-

grams at that time were only indefinitely foreseen and had not greatly impressed the public.

In the three State Departments of Health under consideration practically all public health activities now recognized as essential are represented. In none of the three is there any definite provision for mental hygiene, but in Massachusetts this activity is well provided for by the Department of Mental Diseases, and duplication would be inadvisable. In Ohio, a mental health program has been initiated by the Department of Public Welfare, but in Michigan, while the matter has been discussed, no program for mental hygiene has as yet been adopted by any state department. Some health workers are disposed to think that the trend of public health will be to develop more and more along mental hygiene lines and that the state that is most forward in this activity will contribute most to the public good.

Ohio is the only one of the three states with a division of the Department definitely engaged in industrial hygiene work. Michigan is making a beginning through one of its field workers, who is lecturing on the subject and making a survey of state industrial conditions. In Massachusetts there is no special need for a division of industrial hygiene in the Health Department as this activity is well looked after by the State Department of Labor and Industries. Some of the newer public health activities, such as cancer control and heart disease control, have not yet been provided for in any of the State Departments of Health, except in Massachusetts, where a program for cancer control of considerable scope has been begun and interesting data have already been collected.

In Michigan, because of the comparatively comprehensive program of the Michigan Tuberculosis Association, the State Department of Health, in order to prevent duplication, has

not assumed much responsibility for the general campaign against tuberculosis. This is quite in contrast with the very ambitious program being carried out by the Department of Health in Massachusetts. Duplication of effort is to be avoided, but a state department should provide at least the nucleus of an activity. Otherwise, since "to him that hath shall be given," the "talent" may be placed elsewhere, if some change in present arrangements should be necessary. Eventually the state may have to assume responsibility for this public health work, which concerns all the people and which must be carried on for many years to come.

In Ohio the activity receiving perhaps the greatest prominence is the one which has to do with county health organization, provided by the Hughes-Griswold Act. The comparatively small percentage of population in Massachusetts that is rural and the highly developed idea of local autonomy in health matters do not justify to the same extent state provision for county organization, and a division to supervise it in the State Health Department. Massachusetts has one county health unit operating on Cape Cod, for the establishment of which special legislation had to be obtained. The insignificant role of the county as a political division in Massachusetts in contrast with that of the township makes it inadvisable except in a few of the more rural areas of the state to attempt making a county unit plan general. A combination of townships, however, whether coextensive with a county or not, might be effected to good advantage in a number of districts. This would insure sufficient territory and financial support to justify well-organized full-time health service which in many cases is impractical for the smaller political units.

State subsidy to such units has come to be recognized as one of the important aids in getting them established, in

preventing an uncertain existence for some of them, and in giving the state a definite right to exercise some supervision over them. Ohio and Michigan are providing such subsidies for their county health units through the State Departments of Health, while Massachusetts has largely confined its aid to local communities to service by state employees.

In Michigan the development of organized rural health work by the county unit plan is more recent, but in 1928 and 1929 such progress was made that this is now one of the main activities of the Health Department. The state has provided subsidies to organize and operate a number of counties, and a director has taken charge of county health organization and development.

The general tendency in public health at the present time seems to be directed toward an effort so to strengthen the local health unit that it may be able to do its own public health work, with the assistance of counsel and advice when necessary from the state health department, so that state health departments do not need to expand indefinitely, and in some cases their work may decrease rather than increase. For some highly specialized services such as mental hygiene, it may continue to be necessary for the state health department to do a considerable amount of the local public health work, but most of the better organized and older departments, such as the three under consideration, seem to have attained pretty nearly their necessary maximum growth.

Administration as Related to Organization

There is considerable variation in the states in regard to activities and subdivisions grouped under administration. In Michigan there is no bureau or division of administration, while in the other two states such divisions are definitely organized. The administrative staff functions satisfac-

torily under either arrangement, the important matter being whether it is sufficiently in touch with all the different lines of activity, and whether the administrative office can be readily approached by any branch or division that may need or seek advice.

There are those who think the main divisions of a state department of health should be limited to four, namely, administration, communicable disease control, vital statistics, and laboratories. The basis for this contention is that these four are permanent activities and the responsibility of conducting each of them can be entrusted by the Commissioner to a director. Those who take this view think that all other activities should be grouped under administration. To other students of public health organization, child hygiene and public health nursing as well as some other activities seem quite as important, quite as likely to be continuous, to involve quite as much specialization, and to require an amount of supervision equal to that required by any of the other activities.

Responsibility and Supervision

All divisions or bureaus of state health departments, including those in the states being considered, must be made responsible to the State Health Commissioner as he is the officer entrusted by the Governor with the duties of public health administration. For convenience, the Commissioner may have all divisions report to or through his deputy, or he may make him responsible for the supervision of a certain number of them. In Ohio the deputy deals with many matters of administration that do not call for the personal attention of the Commissioner; in Michigan the deputy is director of and assumes responsibility for a number of activities; while in Massachusetts the deputy is director of one

special activity and acts as administrator of the whole department only in the absence of the Commissioner. These arrangements all work satisfactorily and are dependent on personal preference and local department organization. The members of staff in a division are responsible to the director of their own division.

It can be laid down as a general principle that all matters of policy and all activities that involve or concern state official or non-official agencies should emanate from or be approved by the Commissioner.

As to the assignment of supervisory duties that may cover more than one activity, the two determining factors must be (1) the kinship between the activities and (2) the qualifications of the person who is to do the supervising. Certain activities readily link themselves up with others: for example, communicable disease control, tuberculosis control, venereal disease control, and epidemiology; all activities for the hygiene of the child and for the most part the functions of the public health nurse; sanitary engineering, general sanitation, and food and milk control. Laboratories and vital statistics have a relationship to many other activities. The assignment of supervision over these activities should be determined by these relationships and not necessarily according to any set form. If any individual activity requires not merely administrative ability but medical judgment and experience, then that activity should be supervised by a qualified medical person, and other supervisory duties assigned to him should have something in common with the duty already entrusted.

As pointed out in the body of the report, the association of activities for supervisory purposes in Massachusetts and in Michigan is fairly satisfactory, because the above principles have been recognized in the assignment of duties.

There are some divisions in every well-organized health department that, because of the technical nature of the work they do, must be supervised by people technically trained. It is, therefore, only when a question of general policy arises or when matters that relate themselves to the administrative work of the health department as a whole call for decision or action, that advice from or supervision by the Commissioner or other administrative officer is needed. An outstanding example of such a division is the laboratory service. There are activities, on the other hand, that may be centered in a division, but because of their less specialized nature and more intimate relationship to the administration of the whole department, may require a very close association with the administrative office. This might be true of the public health education or the publicity division, wherein the work done is of a much less technical nature but should in large measure be the vehicle to present to the public the policies, practices, and advice of the department administration. For divisions of such a character it naturally follows that the administrative office will assume a much larger part in directing activities as well as in formulating policies.

The general principle in grouping activities must be determined by the character of the work being done and the interrelationship between activities. In Michigan it has been found advantageous to group child hygiene and public health nursing together, in Massachusetts to group in one division hygiene, public health nursing, and public health education, while in Ohio there are three separate divisions, one for each of the three activities. A multiplicity of divisions is inadvisable, but individuality and responsibility can be developed in a group when it has a certain independence. Individuality and self-expression are sometimes impaired when a group such as public health nursing is merged into hygiene or child hygiene.

It is now a standard generally accepted by all public health nursing organizations that nursing service is best performed through a nurse directorate, and that a nursing division with such a directorate should be organized if a sufficient number of nurses is employed. From the nurses' standpoint this seems to be the most satisfactory arrangement, but in a number of state and municipal health departments a different arrangement exists and has been found to work satisfactorily.

As a general principle it seems advisable that a nurse should be named who will direct nursing activities and to whom individual nurses may look for counsel and direction. Nursing, however, is related to so many public health activities that for the coordination of its work and for the general direction of nursing as a whole the nurse director should be responsible to some officer who has jurisdiction over all activities in which nursing is involved. Ohio has an organized division of nursing, but that division conceives of its functions as the furnishing and supervising of nursing service for other divisions. Someone must determine to whom such service is to be given.

In Massachusetts, the laboratories constitute two divisions and have places as subdivisions in two other divisions, while in Michigan and in Ohio the laboratories are all in one bureau or division and are all housed in one building. The placing of all laboratory work under one head has very definite administrative advantages, but from the nature of the field experimental work and the research work being carried on in Massachusetts, it would not be easy and perhaps would not be advantageous to combine the different laboratories. Besides, there would be difficulty in finding space in one building at the present time to house all the different branches of laboratory work.

In Michigan and in Ohio most of the detail of administration is handled by the deputies to the Commissioner and to the Director, respectively; in Michigan and in Massachusetts the deputy is in charge of the Communicable Disease Division, but in the former state that officer assumes a good deal more of the administrative responsibility. In all of the states the facilities for keeping the administrative head of the Health Department in touch with activities in the field as well as with activities in the offices of the Department are well provided for and developed.

Vital Statistics

In all three states vital statistics records, as can be seen from the sections dealing with them, have reached a high degree of accuracy and completeness. Massachusetts possesses the most complete records, but the Health Department cannot profit to the degree it should from vital statistics data because the Division is still in the Department of the Secretary of State and is not a corporate part of the Department of Health and the facts of vital statistics become a matter of history rather than data to provide a working program for communicable disease control, child hygiene work, or other activities. Ohio has not yet been able to reach so high a degree of completeness in its vital statistics as has Massachusetts, nor has it been able to make its statistical data so practically useful as has Michigan. Michigan not only has reached a high degree of excellence in the completeness of its reports, but its recording of communicable disease cases, its relating of the reports of these cases to mortality reports, and its furnishing of this and other information daily to the communicable disease bureau make the Bureau of Records and Statistics one of the greatest aids in dealing with communicable disease problems.

Communicable Disease Control

The Health Departments of all three states have prepared rules and regulations for the control of communicable disease, and all of these rules are in accord with what is considered the best public health practice. Michigan and Ohio have very complete rules, while those of Massachusetts are limited to a few of the more common acute communicable diseases. Massachusetts' Department of Health has no legal authority to draw up rules that must be universally adopted by the state, so the farthest it can go is to prepare and publish a set of minimum requirements and suggest that they be adopted by local health boards. The Massachusetts law gives the State Department of Health coordinate powers with a local board of health, but in actual practice the State Department exercises no such authority and the enforcement of rules and regulations is dependent on local boards of health.

As public health is a matter that may concern more than the area which lies within the boundaries of any one administrative district, it seems advisable, even while preserving local autonomy as much as possible, to give the state department authority to act locally under certain conditions. The purpose lying back of Massachusetts' method, namely, the training and developing of local organizations that they may take necessary action, is undoubtedly more desirable than the mere performance of certain services for these organizations. On the other hand, the authority exercised and the uniformity sought by Michigan and Ohio do not result in any less effort to cultivate action on the part of local authorities. If the smaller units could be enlarged so as to provide full-time service, the principle of local autonomy could be more justifiably preserved and in the smaller municipalities of

Massachusetts there would result a condition similar to that being evolved in many of the Ohio and in a few of the Michigan counties, where the local public health organization is so well qualified and equipped that the State Department needs to exercise very little supervision.

All three states are well equipped to give diagnostic assistance to physicians and to conduct epidemiological investigations. The extent of such work can be measured fairly well by the data shown elsewhere in the section on communicable disease control, although with a growing improvement in local diagnostic facilities the services of the state officers are not so often in demand. The scope and extent of preventive work can also be measured by the volume of work recorded. Promptness of action when preventable disease occurs is one of the measures of efficiency. Such action is taken by the district health officers in Massachusetts and by the field epidemiologists in Michigan, although the greater distances to be traveled and the smaller number of workers available place Michigan at a slight disadvantage. In Ohio the number of local full-time health officers with presumably a fair degree of public health training reduces the amount of service required from the State Department of Health. The extending of the county health unit plan with qualified local service to include all communities is the more logical and satisfactory method of providing adequate local health service.

Venereal Disease Control

It has been shown elsewhere that none of the Departments has at the present time either a large personnel or a highly developed organization to deal with this problem. Judging by reports of cases and follow-up work, Michigan is far outstripping the other states in what is being done to control venereal disease. Massachusetts has no definite facilities

for learning of sources of infection and thus cannot induce these sources to undergo treatment, and Ohio is not giving any special prominence to venereal disease work, except through the services of the lecturer. Michigan, on the other hand, has a law enforcement group that is most successful in getting compliance with the Department's regulations.

Tuberculosis Control

In this activity, Massachusetts takes a very decided lead over the other states, and in its effort not only to provide hospitalization but to discover cases of tuberculosis in the young has set the pace for health departments in all other states. Michigan has been progressive in making provision for the hospitalization of tuberculous cases, but the State Department of Health has left to the Michigan Tuberculosis Association most of the actual state campaign work against tuberculosis. Ohio is following out a program that, if it can be made generally successful, is highly desirable, namely, a program to have every physician competent to diagnose and advise in regard to tuberculosis. If health examinations could be made general, the Ohio method would be the one of choice. The present defect in Ohio's program is that people will not go to a physician if they are not definitely ill, unless some continuous or special educational campaign has been carried on. This the Health Department will have to undertake.

Sanitary Engineering

In all three states sanitary engineering has a prominent place among the activities of the Department of Health. In Massachusetts, the Division has had a long and important history and, in conjunction with the Water and Sewage Laboratories, has been able to do more research and experimentation on water and sewage than any similar division

in other state departments of health. The value of its work is not to be measured solely by its local accomplishments, but by the contributions made to the general sum of knowledge on treatment of water and sewage. The large percentage of the state population using public water supplies is due in some degree to the density of population and to the nature of the supplies, as well as to the educational work and initiatory sanitary measures adopted by the Division. The Michigan Bureau has had too wide a field to cover in a short space of time to accomplish what has been done in Massachusetts; the necessity, too, for public supplies is not so definite in the many sparsely settled areas in the state, particularly in northern Michigan. Ohio, located in the middle west, with a high degree of pollution and of turbidity in its water supplies, has special problems to solve in connection with drinking-water supplies and sewage disposal. The progress being made in that state in reducing the amount of pollution and in the treatment of waters to make them safe is commendable. The Sanitary Engineering Division of the State Department of Health has been the chief agent in effecting these improvements, but it has had exceptional cooperation and support from industrial organizations. The sanitary engineering problems in the three states differ considerably so that comparison of accomplishments would not tell the whole story of progress, but sufficient data have been submitted in the sections on Sanitary Engineering to give the student a fair idea of the relative functions and accomplishments of the different divisions.

Laboratories

Massachusetts, as already indicated, has made important contributions through its laboratories to our knowledge of

methods of treatment of water, sewage, and wastes. Michigan has also become well known through its research diagnostic laboratory work, while Ohio through its State Department of Health Laboratories has endeavored to meet the laboratory needs of the state but has not attempted or carried out either the manufacture of biologics or research work on the same scale as the other two states. Michigan, with its laboratories housed in the commodious State Office Building, has the advantage of having all its laboratories grouped together with each laboratory section working not along diverse or even parallel lines, but on lines that converge to one objective, because all laboratory activities are under one Director. Massachusetts, on the other hand, has many laboratories working more or less independently, except where closely related kinds of work are being done, as in the Experiment Station at Lawrence and the Water and Sewage Laboratory in Boston, and in the special Diagnostic Laboratory at Harvard Medical School and the Biological Laboratory at Forest Hills. Field experimental work in Massachusetts makes necessary field laboratories, so that to become acquainted with what is being done in the laboratories, one has to visit many places. However, the laboratory work as a whole does not seem to suffer appreciably from its dissociation into so many different units. The Director of Health in Ohio is of the opinion that many biologics can be purchased as cheaply as they can be manufactured, so little is done in the way of manufacture by the Ohio Laboratory. This may have been one factor in giving less prominence to the Laboratory in the thought of the people and in providing less incentive for the Laboratory to expand and make its presence felt in the state. The data submitted in the section on laboratories will give a fairly definite conception of the character and volume and also

something of the quality of the work being done in the different laboratories.

Child Hygiene and Public Health Nursing

Different combinations exist in different states as to the way in which child hygiene or hygiene and public health nursing are related to each other or to other activities. There seems to be some justification for having child hygiene and public health nursing in one bureau as they are in Michigan, and yet all nursing activities are not confined to child hygiene, and neither is all child hygiene work represented in what is done by the nurses. Where the number of persons at work on these activities is considerable, it might be better to have separate divisions as in Ohio, or at least subdivisions, for much can be accomplished in public health through developing an active nursing service, and a positive aid in developing this is to give the group a definite place among other divisions. Where "hygiene" is the title given a division without any defining or limiting term, the division may include a great variety of lines of activity, as it does in Massachusetts. There is perhaps no set number of divisions or groups that will suit all states, so each state finds it best to adhere to the arrangement or grouping that fits in best with its local problems, programs, and available personnel.

Massachusetts has elected to plow its own furrow so far as a child hygiene program is concerned, and, as the statistics and facts show, has been able to do work of good quality and considerable volume. The feeling that states should assume the financial responsibility for their own health programs, the highly developed desire for local autonomy in Massachusetts, and the fact that the State Department of Health lacks legal authority to initiate programs in local

health districts unless invited to do so were perhaps factors in Massachusetts' decision to finance its own child hygiene program. The other two states, Michigan and Ohio, accepted federal aid made available through the Sheppard-Towner Act for their programs and have also been able to do good work. The problems as a whole differ so much in the three states, the rural problem bulking so much larger in Michigan and in Ohio than in Massachusetts, that it is not possible to make comparisons. The actual accomplishment as reported will give an index of the volume and efficiency of the work. There are so many factors that contribute to the success of an activity such as child hygiene, that it is not always fair to attribute success to the inclusion or exclusion of any one factor. The medical service available has to be considered, the cooperation of the people, and a dozen other things that must all unite to insure the success of any project.

Data will be found covering the subjects of maternity, infancy, the preschool child, and the school child, as well as public health nursing. The activities on behalf of school children are in all three states carried on for the most part by the Department of Education or by local school boards, often assisted by the state or local tuberculosis associations.

In Massachusetts the law requires that definite provision be made by schools for nursing and medical services; in Ohio school children have to be medically examined, the physician being employed by either the school board or the board of health. The Massachusetts Department of Health (Division of Hygiene) has members of its staff giving their whole attention to school hygiene; there is no such provision in Ohio; and in Michigan about the only group in the State Department doing work in the schools is the Bureau of Epidemiology

in its immunization campaigns. Up to the present time the hygiene of school children has received perhaps more attention than that of any other group, but that does not diminish the obligations of the health department. Unless it has been definitely decided that the department of education is responsible for the health of the school child, a health department cannot afford to ignore or give scant attention to the school group in the thought that it is receiving attention from another source, and in the matter of control of communicable disease it cannot delegate its legal responsibility to any other agency.

Popular Health Instruction

Programs of popular health instruction are being carried on in all three states. In Michigan the Bureau of Public Health Education constitutes one of the general divisions of the State Department of Health. In Massachusetts and in Ohio the activity is one of the subdivisions of the general branches of the Department, in the former state under the Division of Hygiene and in the latter partly under Child Hygiene and partly (for publicity activities) under the Division of Administration. Each of the states publishes a bulletin. Those issued by Michigan and Massachusetts contain a much greater proportion of scientific papers on public health subjects, while Ohio's publication contains mostly short popular statements in regard to scientific papers and public health research and aims to present local public health news items of the day in popular form. Both types of health instruction are desirable, according to the class of reader to be reached. For the person seeking information, the former is the better, while for the person in whom an interest in public health has to be created, the latter is perhaps preferable. The different lines of popular health instruc-

tion adopted in the three states have been indicated in the section dealing with this activity (see page 139).

The training of health officers is not usually classed under popular health education. It is a function which the State Department of Health of Ohio has been performing through the Darke County and Greenville Training Station, to which reference is made in the body of the report. Michigan is now starting similar training work for health officers and public health workers. The Massachusetts Department does not conduct a training station, but it assists materially the schools of public health in Boston and in Cambridge and also in the public health training of undergraduate medical students. The providing of qualified persons for public health work is frequently an activity necessary to the state department itself and may also have a desirable function as an aid to other states.

Other Activities

In Ohio and Michigan, milk, food, and drug supervision is not a responsibility of the State Health Department; in Massachusetts, on the other hand, the Division for Food and Drugs is a division of the State Health Department, and some responsibility is placed on the Department in regard to cold storage, standards for pasteurization of milk, and sanitary inspection. So long as there is cooperation between the Department of Health and the Department of Agriculture (which usually has responsibility for the supervision of milk and other foodstuffs) and so long as the Department of Health has jurisdiction in regard to diseases communicated through milk and food, there seems no cogent reason why the State Department of Health should not be relieved of the milk and food inspection detail, particularly when the inspections have largely to do with the

quality of the article rather than with the question of its being a medium of spreading disease.

Ohio is the only state that has an organized Division of Industrial Hygiene in its Health Department, although Michigan is carrying on survey work that may be preliminary to the establishment of such ă bureau.

None of the State Departments of Health has attempted to carry out a program of mental hygiene, and Massachusetts is the only state that has a well-organized Division of Mental Hygiene at work in connection with another State Department.

The cancer problem has been given marked attention by the Massachusetts Department of Health, but very little has been done in the other states. In no one of the three states has the State Department of Health adopted a program in regard to the control of heart disease.

Michigan has a Bureau of Mouth Hygiene and Preventive Dentistry. In Massachusetts some work on dental hygiene is done by the dental hygienists and nutritionists of the Division of Hygiene, while in Ohio whatever has been done was largely incidental as part of the general educational program and the demonstrational work carried on at the clinics. A bureau of dental hygiene was established in January, 1930.

Comparative data in regard to the budgets of the three states are given in brief form in the main body of the digest.

APPENDIX A

APPRAISAL STANDARDS

FOR those who may wish to measure the achievement of the health departments of Massachusetts, Michigan, and Ohio, some of the standards used by the American Public Health Association in making appraisals of public health activities in cities and in rural districts[1] are herewith appended.

In the many instances in which standards differ somewhat for urban and rural health work, it is naturally impossible to apply either standard precisely to the state as a whole. If urban and rural populations were sharply and invariably defined, it would be possible to compute a ratio for each state which would indicate how much the urban and rural standards should be weighted for local application. Unfortunately this is not the case.

In framing the details of the appraisal forms, the word "urban" was used uniformly to designate incorporated communities of 2,500 or more. In Massachusetts, by this definition, 95 per cent of the population is urban, 5 per cent rural; in Michigan, 62 per cent urban, 38 per cent rural; in Ohio, 64 per cent urban, 36 per cent rural.

In the field use of the appraisal forms, however, the "city" form has usually been reserved for cities of substantial size, and the rural form has commonly been applied to mixed urban-and-rural communities—a county of 30,000, for instance, in which a third of the residents are to be found in the technically "urban" county-seat and market-towns. This fact makes the strict application of the percentages cited

[1]See: *Appraisal Form for City Health Work* (New York: American Public Health Association, third edition, 1929); *Appraisal Form for Rural Health Work* (New York: American Public Health Association, first edition, 1927).

in the last paragraph an unsatisfactory guide in measurement of state performance. Any exact rating must be based on a more elaborate analysis of population than is appropriate here.

TABLE XXIX

APPRAISAL STANDARDS OF PUBLIC HEALTH ACTIVITIES USED BY THE AMERICAN PUBLIC HEALTH ASSOCIATION

HEALTH ACTIVITIES	CITIES	RURAL
Communicable Disease		
Cases reported per death		
Typhoid fever	10	7
Diphtheria	15	15
Scarlet fever	50	50
Measles	60	[1]100
Whooping cough	25	25
Control		
Diphtheria		
All known susceptible contacts cultured	Required	...
Fifty per cent of susceptible contacts immunized	Required	...
Cases released on two negative cultures	Required	...
Cases released on negative cultures	...	Required
Typhoid fever		
Cases released on two negative cultures from stool and urine	Required	Required
Smallpox		
Susceptible contacts successfully vaccinated or effectively controlled for 21 days	Required	Required

Note: No entry indicates no requirement.
[1]Requirement will probably be reduced in next revision.

TABLE XXIX—Continued

HEALTH ACTIVITIES	CITIES	RURAL
Scarlet fever		
Child contacts effectively controlled for 7 days	Required	Required
Visits to cases, per case		
Diphtheria	4	3
Scarlet fever	4	2
Typhoid fever	4	3
Acute anterior poliomyelitis	4	1
Meningococcus meningitis	4	1
Measles	2	2
Whooping cough	2	1
Diagnostic service		
Diagnostic calls per 100,000 population	100	50
Per cent of cases hospitalized		
Typhoid fever	40.0	25.0
Diphtheria	25.0	10.0
Scarlet fever	25.0	5.0
Smallpox	50.0	25.0
Immunization each year		
Diphtheria		
Children under 5 years:		
Per cent of average number of births	60.0	...
Per cent of preschool population	...	20.0
School children:		
Per cent of school registration	10.0	10.0
Smallpox		
Per cent of first grade children	95.0	95.0
or, Per cent annually of total population	...	3.0
Per cent of sixth grade children	95.0	...
or, Per cent annually of total population	5.0	...

TABLE XXIX—Continued

HEALTH ACTIVITIES	CITIES	RURAL
Venereal Disease		
Cases reported per year per 100,000 population	600	400
Clinic registration per 100,000 population	800	800
Visits to clinic per case registered	15	10
Per cent of discontinued (lapsed) cases returned	60.0	60.0
Per cent of new cases reporting source of infection	10.0	...
Per cent of reported sources of infection located and examined	50.0	...
Tuberculosis		
Cases reported per annual death (average for 3 years)	2	2
Cases on register per annual death (average for 3 years)	5	...
Visits to clinic per death	15	10
Visits to clinic per patient registered	5	3
Per cent of cases incipient when diagnosed	25.0	25.0
Number of contacts examined per new case registered at clinic	3	...
Visits by nurse per annual death	50	20
Visits by nurse per diagnosed case registered	8	...
Visits by nurse per death to post-sanatoria cases	10	...
Per cent of tuberculosis field nursing visits made to post-sanatoria cases	...	10.0
Hospital care		
Patient days per death	250	150
Per cent of total admissions which are incipient cases	25.0	25.0
Per cent of total admissions children under 12	10.0	...
Per cent of total admissions children under 15	...	15.0

TABLE XXIX—Continued

HEALTH ACTIVITIES	CITIES	RURAL
Number of children per 1,000 grade school population attending open air camps, preventoria, or day camps	10	5
Maternity and Child Hygiene		
Per cent of deliveries in hospitals	40.0	10.0
Per cent of prenatal cases under clinic supervision[2]	10.0-30.0	...
Per cent of prenatal cases under nursing supervision[3]	15.0-40.0	25.0
Visits to clinic per prenatal case registered	5	...
Visits to clinic per 100 births	...	50
Nursing visits per prenatal case registered	5	...
Nursing visits per 100 births	...	75
Visits by infants to clinics per 100 live births[4]	150-300	...
Visits by infants to clinics per birth[4]	...	2.5
Nursing visits to infants per live birth[4]	3-6	1.5
Visits of infants to clinics per case registered	5	...
Nursing visits to infants per case registered	10	...
Visits by infants to nurses' conferences per live birth	...	.8
Per cent of preschool children (under 6 years) registered at clinic	30.0	...
Per cent of preschool children with nursing service	30.0	...
Visits to clinic per child registered	4	...
Visits to clinic per 100 preschool population	...	20
Nursing visits to preschool children per registrant	4	...

[2]Activity requirements based on infant mortality rate. A high rate calls for high requirements.

[3]Based on death-rates of infants under one month, 30 to 50 per 1,000 live births. A high rate calls for high requirements.

[4]Based on infant mortality rates, 50 to 100 per 1,000 live births. A high rate calls for high requirements.

TABLE XXIX—Continued

HEALTH ACTIVITIES	CITIES	RURAL
Nursing visits to preschool children per 100 preschool population	...	10
Per cent of preschool children examined physically before entering school	20.0	...
Per cent of schools having daily inspection of children for signs of communicable disease	95.0	25.0
Per cent of schools with adequate sanitary equipment	95.0	90.0
Per cent of school children having medical examination	75.0	30.0
Per cent of school children brought to professional attention for		
teeth	75.0	49.0
vision	10.0	.5
hearing	2.0	...
nose and throat	15.0	2.5
heart	1.0	...
heart or lungs	...	1.0
Nursing visits per 100 elementary school children	40	20
Visits per 100 by grade school children to nurses' conferences	...	20
Number of minutes per week given to systematic health instruction	40	40
Sanitation		
Inspections of food-handling establishments per 100 population	4	...
Per cent of milk pasteurized	100.0	100.0
Per cent of milk having bacterial counts less than 500,000 per c.c. before pasteurization	90.0	[5]95.0
Per cent of pasteurized milk having counts less than 50,000 per c.c.	80.0	[5]95.0

[5]Requirement will probably be reduced in next revision.

TABLE XXIX—Continued

HEALTH ACTIVITIES	CITIES	RURAL
Per cent of dairy cows tuberculin tested . . .	100.0	100.0
Sanitary inspections and reinspections per 100 population	3	1.5
Per cent of drinking water supplies meeting U. S. Treasury Department standards . . .	100.0	[6]100.0
Per cent of supplies adequately protected . .	. . .	[6]100.0
Per cent of ten c.c. domestic samples showing B. Coli	20.0	. . .
Per cent of dwellings connected with sewers .	95.0	[7]100.0
Per cent of unsewered dwellings having satisfactory disposal systems	100.0	100.0
Laboratory Service		
Diphtheria specimens per annual death from diphtheria	250	100
Typhoid specimens per annual death from typhoid	80	30
Tuberculosis specimens per annual death from tuberculosis	6	5
Syphilis specimens per 1,000 population . . .	20	. . .
Syphilis specimens per case reported	. . .	6
Gonorrhea specimens per 1,000 population . .	3	. . .
Gonorrhea specimens per case reported . . .	. . .	3
Certified milk specimens per 100,000 gallons .	200	. . .
Pasteurized milk specimens per 100,000 gallons	60	. . .
Raw milk specimens per 100,000 gallons . . .	30	. . .
Milk specimens per 1,000 urban population .	. . .	10
Frequency of examination of water supplies .	Daily	Monthly
Examination of semi-public water supplies per 1,000 population per year	. . .	1

[6]Required in urban sections of rural communities.

[7]Required in urban sections of rural communities. Requirement will probably be reduced in next revision.

TABLE XXIX—Concluded

HEALTH ACTIVITIES	CITIES	RURAL
Total laboratory examinations per 1,000 population	60	...
Cancer Control		
Visits to clinics per 100 deaths from cancer	160	...
Visits by social workers or nurses per death	4	...
Hospital admissions per 100 deaths	110	...
Visits by nurses or social workers to post-hospital cases per death	6	...
Heart Disease Control		
Visits to clinic per death from heart disease	1	...
Visits to clinic per patient registered	2	...
New patients registered in year per 100 deaths	15	...
Per cent of heart patients under twelve	25.0	...
Visits by nurses or social workers per 100 deaths	30	...
Hospital admissions per 100 deaths	3	...
Number of beds in convalescent homes for heart cases per 100 deaths	2	...

APPENDIX B

SELECTED BIBLIOGRAPHY

Most of the statistics and much other data for the digest were obtained by consulting unpublished records and through personal interviews with commissioners, directors, and others; the following is a list of some of the books and reports consulted.

American Medical Association. *American Medical Directory, A Register of Legally Qualified Physicians. . . .* Chicago, American Medical Association, 1927.

American Medical Association Council on Medical Education and Hospitals. "Hospital Service in the United States, 1927-1928," *Journal of the American Medical Association*, 90: 911-982. (March 24, 1928.)

American Public Health Association Committee on Administrative Practice. *Appraisal Form for City Health Work.* Third Edition. New York, American Public Health Association, 1929.

American Public Health Association Committee on Administrative Practice. *Appraisal Form for Rural Health Work.* New York, American Public Health Association, 1927.

Bigelow, George Hoyt, M.D., and Adams, F. Dennette, M.D. "Rural Medical Service in Massachusetts," *Boston Medical and Surgical Journal*, 92: 1097-1106. (June 4, 1925.)

Bigelow, George Hoyt, M.D., and Forsbeck, F.C., M.D. "Milk-Borne Diseases in Massachusetts," *American Journal of Public Health*, 17: 1019-1023. (October, 1927.)

Bigelow, George Hoyt, M.D., and Lombard, Herbert Luther, M.D. "Experience with the Program of Cancer Control in Massachusetts," *American Journal of Public Health and The Nation's Health*, 18: 413-420. (April, 1928.)

Chapin, Charles Value, M.D. *A Report of State Public Health Work Based on a Survey of State Boards of Health.* Chicago, American Medical Association, 1915.

Crowell Publishing Company. *The National Market.* New York, The Crowell Publishing Company, 1927.

Massachusetts Health Department. *Annual Reports.* 1926-1927.

Massachusetts Health Department. *Manual of Laws Relating to Public Health.* 1922.

Massachusetts Tax Commissioner's Department. *Aggregates of Polls, Property and Taxes as Assessed. . . . May 1st, 1927.*

Massachusetts Vital Statistics Division. *Annual Reports.* 1925-1926.

Michigan Health Commissioner. *Annual Reports.* 1926-1927.

Michigan Health Department. *Rules and Regulations for Control of Common Communicable Diseases.* 1927.

Michigan Health Department. *Health Officers' Manual.* 1928.

Michigan Secretary of State. *General School Laws.* 1926.

Michigan Secretary of State. *Laws Relating to Public Health.* 1927.

Michigan Statutes. *Laws Relating to the Department of Agriculture.* 1927.

National Industrial Conference Board. *Annual Report.* 1927.

Ohio Health Department. *Ohio Health News.* 1926-1927.

Ohio Health Department. *Public Health Manual.* 1925.

Shaffer, E. R., M.D. "Expenditures per Capita for Health Work in the Rural Districts in Ohio," *American Journal of Public Health,* 17: 1008-1018. (October, 1927.)

United States Census Bureau. *Reports of the Director.* 1880-1926.

United States Department of Agriculture. *Annual Report.* 1927.

United States Public Health Service. *Health Departments of States and Provinces of the United States and Canada,* Compilation by J. A. Ferrell and others. Public Health Bulletin No. 184. Washington, Government Printing Office, 1929.

HARVARD UNIVERSITY

http://lib.harvard.edu

If the item is recalled, the borrower will be notified of the need for an earlier return.

COUNTWAY

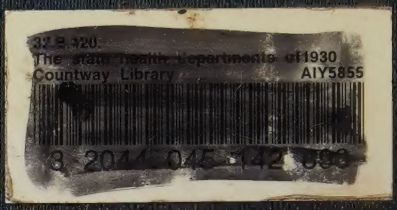
FEB 10 2011

BOOK DUE

Thank you for helping us to preserve our collection!

32.B.420.
The state health departments of1930
Countway Library AIY5855
3 2044 045 142 890

COUNTWAY LIBRARY
HC 4R1D V


32.B.320
The State Health Departments of 1930
Countway Library
AIY5855